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CINEMA TICKETING SYSTEM

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Abstract

Cinema Ticketing System (CTS) is my final year thesis project title. CTS is a web-enable management system. It designed for a local cinema organization use. With this capability, the system is able to provide tightly integrated online real-time reservation, payment transaction, order and electronic information dissemination such as email and promotion to its members. Moviegoers, employee and the management level are the target groups who will benefit if the system developed in a success.

This report introduces the CTS project. It defines the objectives, significance, scope and project schedule that should identified before development of this system. Beside that, it has a description on the topic studied and researched during the literature research and literature review.

In the analysis phase, the V Model with prototyping approach was selected for the development process because the strengths of both the V model and prototyping can be combined in a single project and reduces the risk involved. The development tool chosen was Microsoft Visual Studio .NET whereas the web server was internet Information Server 5.0 with back end database Microsoft SQL Server 2000. All these will be deployed on Windows 2000 Advance Server platform.

For the movement, Golden Screen Cinemas is the only cinema company who implement an online booking service in Malaysia. But the service thus far has many weaknesses that could be exploited into a much reliable and efficient system both to the management and customer. From here, lies a great opportunity to change and improve a system that promises better service in the business service sector that implies E-Commerce.

Acknowledgement

First and foremost, I would like to extend my sincere appreciation to my supervisor, Dr. Rosli Salleh. Thanks for his guidance, invaluable advises and instruction, opinion and thoughtful contribution throughout this project.

Secondly, I would like to take this opportunity to express my gratitude to Mrs. Nornazlita Hussin to sparing her precious time to be my moderator. For special mention, I would like to express my sincere gratitude to my course mates and friends Tham Hon Hoe, Ng Chee Wai, Lor Chee Loong, Raymond and Sim Kong Wei in sharing thoughts and knowledge. Your patience, constructive criticism and suggestions were essential and much appreciated.

A highly appreciated to Mr. Heng who is so kind to provide and lent me the material such as the reference book for me to accomplish this project.

Lastly, but not least, I intend to dedicate to my family members who have supported me. I am indebted and grateful to all of them.

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Chapter 1

Introduction

Chapter 1: Introduction

1.1 Project overview

Recently, a lot of online transaction is available on the web. The sophisticated business transaction can be implemented all over the world through internet and intranet. Cinema Ticketing System (CTS) in a web enable system that design to fulfill the requirement of a cinema organization. It is an integrated system to manage the organization efficiently and systematically. Therefore, all the operations and process of the transaction will be facilitated and easily.

Cinema Ticketing System (CTS) has three functional modules, which are Customer administration module, Staff administration module, and Manager administration module. These three functional modules will perform all needed tasks which are ticket reservation, payment transaction, information dissemination facilities, reporting, hall management, seat management, movie information management, user profile management, and promotion. With these, Cinema Ticketing System (CTS) could help reinvent a better business management movie theater which is gaining popularity as entertainment centers.

1.2 Project objectives

With our prime minister, Datuk Seri Dr. Mahathir's vision of Multimedia SuperCorridor (MSC) will soon become a reality as our country is moving from industrial age into information age. The future looks bright for those who have and will invest time procuring knowledge on this gigantic global network.

This project is a hope to develop new business processes and supporting information system processes and services to create efficiency and effectiveness in ticket booking in movie theaters online. It is anticipated that the resulting system will provide for high integrated processes and services that cross many internal business functions and reach directly to customers. It is anticipated that this project will result more than one of the following:-

1. To reach out to customers in a direct market approach results in significant competitive advantage for movie theaters in a highly competitive market.
2. To give a better service to customers and fulfilling their needs.
3. To create a systematic cataloging system of updated releases and keep a high maintenance profile of each movie for easy information retrieval.
4. To understand the working of e-commerce and identify electronic payment methods that feasible through the internet.
5. Improve quality of service towards customers and keep track records of gross sales of tickets according to movie releases.
6. Maintain a well kept scheduling system of room for movie screening purposes and other business functions and conventions.

1.3 Project Conception

This project was conceived from sources that have recognized the need for system improvement in movie theaters especially in the aspects of online booking. Sources believed that a better strategic information system plan should be developed to help both management needs and customers wants. The information system establishes priorities for database, the internet as the system platform, multimedia applications and web-based applications. The development of this project is proposed using Microsoft products such as Visual Basic 6.0, Active Server Pages (ASP), a new revolutionary programming framework that enable rapid development of powerful web applications and services, SQL Server or Access 2000 which is a database development application, web development tools such as Visual Interdev and FrontPage 2000 and Macromedia products such as Flash 5.0 and DreamWeaver MX. Use and choices of software in the development of the systems are prior to changes during the design and development changes.

1.4 Project Scope

The target groups to use this system are moviegoers who use the internet often, the employees who are involved directly in the ticket reservation and booking process and the management itself for better administration handling.

The project scopes of CTS for Customer administration section are:-

- To enable customer to view the status of seat, information of movie on show, prize, announcement, and promotions.
- To enable customer to buy movie ticket online from anytime and anywhere.

The project scopes of CTS for Staff administration section are:-

- To enable staff to modify his or her reservation information, or simply have them access it for viewing any given time.
- To enable staff to see information corresponding to any movie through CTS, information presented includes room numbers, availability of room, number of available and occupied seats, as well as date and show time of respective movie and promotion.

The project scope of CTS for Manager administration section are:-

- To enable the manager to view a list of show time, the managers have the ability to add movies, remove movie or change movie or room schedules.
- The manager is able to access the Modify/Cancel Reservation option.
- To enable the manager to update the promotion and announcement.

1.5 Project Schedule

A brief timeline of the development stages is illustrated in the figure below. The proposal at the moment is at the prior stages of system designing and system analysis.

1. Project planning
2. Requirement analysis
3. Data collection
4. Decision analysis/planning of development
5. System analysis
6. System design
7. Prototype development
8. System development
9. Integration testing
10. System testing
11. Documentation

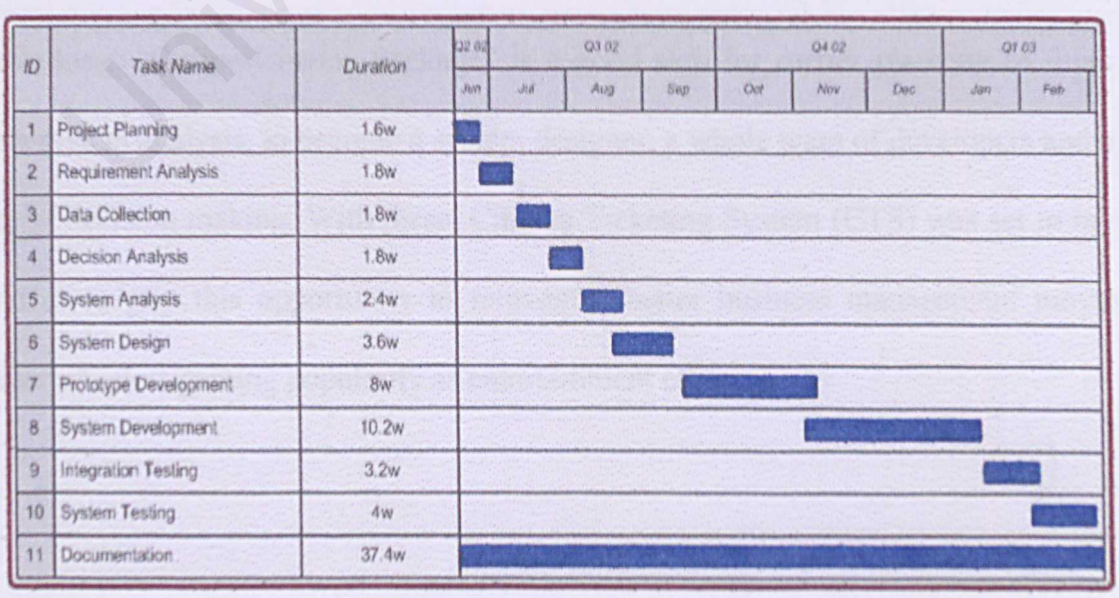


Figure 1.1: The Gantt chart show the Timeline Development for CTS

It is recognized that the project scope and timeline may need to be refined over the course of the project.

1.6 Project Motivation

There are few reasons for me to develop the "Cinema Ticketing System" and actually this idea was brought out by my colleague when I was undergoing my industrial training at Global Soft (MSC) Berhad. Because at that time, he just finished his study at Australia and came back to Malaysia, he found that our local online cinema booking system still got few weaknesses and it presented opportunities for vast improvement. For me, it was a business solution that required simple solution which would expose to the power pull of the influence at E-commerce. This project touches all the elements of what knowledge I managed to obtain during my three years on studying in University of Malaya; a touch of marketing, human resource management, database management, graphics application programming, network programming and so on. As I am pursuing a degree in Computer Science majoring Networking, "Online Cinema Package" is a good step for carrier planning to think like a system analysis, to become a system designer, a whole team of developers and a taste of decision making. With these, Cinema Ticketing System (CTS) was set in my mind as to grip this opportunity to reinvent a better business management movie theater which is gaining popularity as entertainment centers.

1.7 Project Business Solution Strategy

The CTS is symbolized as a business prototype model to find solutions for problems existing in the current online system of the local theaters using Information Technology and Computer Science techniques. So a strategy is presented to identify the problems, to seek opportunities and to reach goals. A decision making model is emphasized in this illustration:-

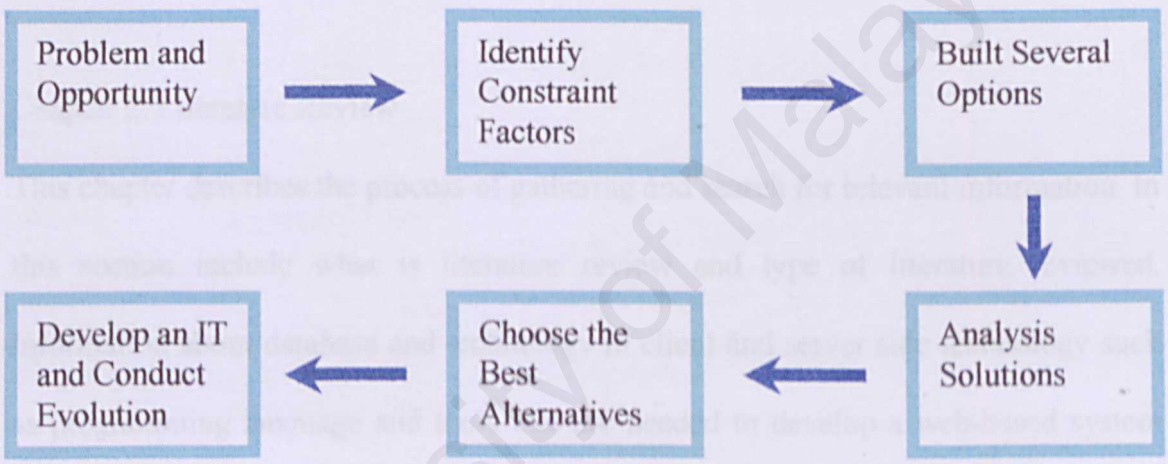


Figure 1.2: Decision Making Process

1.8 Project Chapter Summarization

The first phase of the project documentation is divided into four parts:-

Chapter 1: Introduction

It is an overview of the CTS project. All the aims and scope of the project is being described and listed properly. It also explains about the limitation in the system, the conceptual of doing this and what is the expected outcome of the project. The project schedule also is shown in Gantt chart.

Chapter 2: Literature Review

This chapter describes the process of gathering and search for relevant information. In this section include what is literature review and type of literature reviewed. Information about database and technology in client and server side technology such as programming language and tools that are needed to develop a web-based system also will be discussed here.

Chapter 3: Methodology and System Analysis

This will clearly identify the methodology, mechanism and approach to be adapted. Then the quality and efficiency of the proposed tools described. All the tools software, operating system and strategy to tackle this project are analyzed and decided in this section. User's requirement and administrative software and hardware are listed here.

Chapter 4: System Design

This chapter will cover the architecture design, database design and process/functional design as well ad interface design of the project. The various

component of the proposed system will be identified and explained. Expected outcome of the project can be viewed through interface design.

Chapter 5: System Implementation

The system is developed using the chosen technical requirement and the appropriate coding and interface are documented.

Chapter 6: System Testing

The system testing phase is done throughout the development of the system. This section describes the level of testing including end-user acceptance test.

Chapter 7: Evaluation and Conclusion

The final phase of the development of the system where the system is evaluated and the system is received on its strengths and limitation.

Conclusion

A brief conclusion of the entire project and the results of the outcome of the development.

1.9 Expected Outcome

As suggested, the expected outcome of the project is summarized as below:-

- The database can easily be upsized to more capable system if the need for increased capabilities and functions arises in the future.
- Provides logging on service and logging off services to improve the security of the system by restricting access to database. Only authorized and authenticity users can enter the system to view or edit the information in the database. Besides that, users are allowed to change their password from time to time.
- Standard graphic user interface across all the system. Simple and user friendly is needed.
- Data input error will be checked and reported to user in a user friendly manner.

The application system prospective

- Staff can help customer to register as a new member and make booking or purchases of the movie ticket when customer come to counter.
- Staff can search the needed information by entering related ID.
- Staff is able to add, update, delete and view customer records.

Website prospective

- Customer able to view and update their profile through internet.
- Provides online reservation/booking of movie ticket and online payment
- Customer can submit their registration details for open a account, send feedback to Cinema organization by sending email.

Chapter 2

Review of Literature

Chapter 2: Review of Literature

2.1 Analysis Studies

2.1.1 Case Study 1 – *http://www.ormondecinemas.com/main.htm*

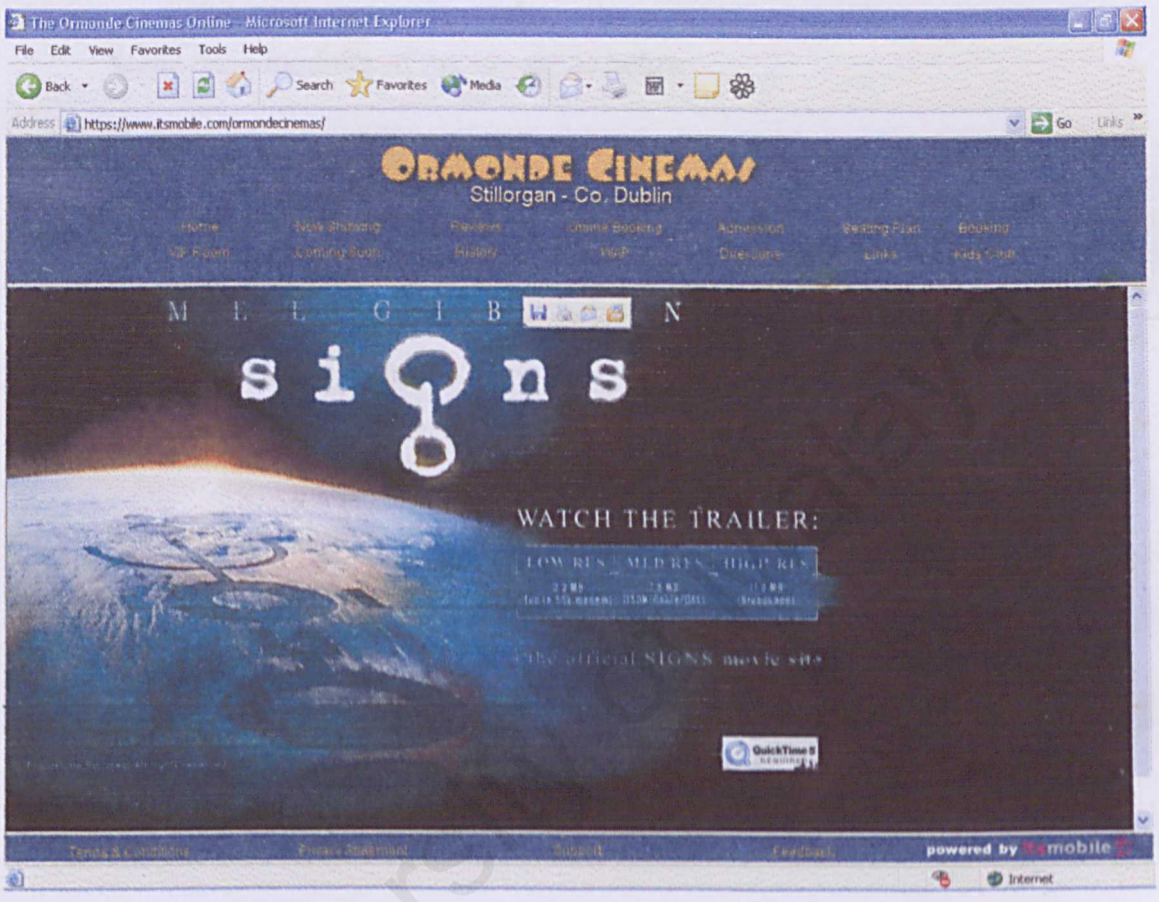


Figure 2.1: The main page of *Ormonde Cinema of Ireland*

The Ormonde Cinema - The latest venue for Conferences, Presentations, Meetings etc. has actually been around as a cinema since 1955. Starting as a single screen facility with 1,000 seats, it was far in advance of older cinemas in style, film presentation & sound.

With an investment of just £2 million, the present seven screen complex was developed to include luxurious armchair seating, state of the art sound and top class lighting & heating.

All the usual facilities can be provided by the company who supplied the sound and projection equipment to the Ormonde Multiplex, GFD Communications, who can also provide the latest data projection systems & video projectors.

Some main modules of the site are as below:

- **Home** module
- **Now showing** module
- **Reviews** module
- **Online booking** module
- **Admission** module
- **Seating plan** module
- **Booking** module
- **VIP room** module
- **Coming soon** module
- **History** module
- **WAP** module
- **Directions** module
- **Links** module
- **Kids club** module
- **Term and conditions** module
- **Privacy statement** module
- **Support** module
- **Feedback** module

2.1.1.1 Result of Study

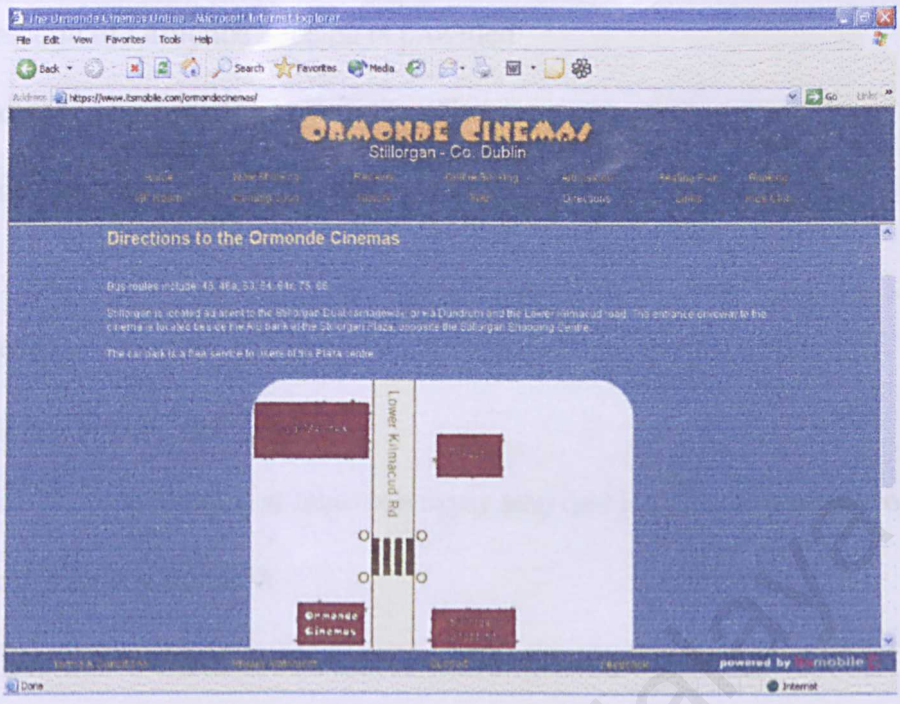


Figure 2.2: Directions to the Ormonde Cinema

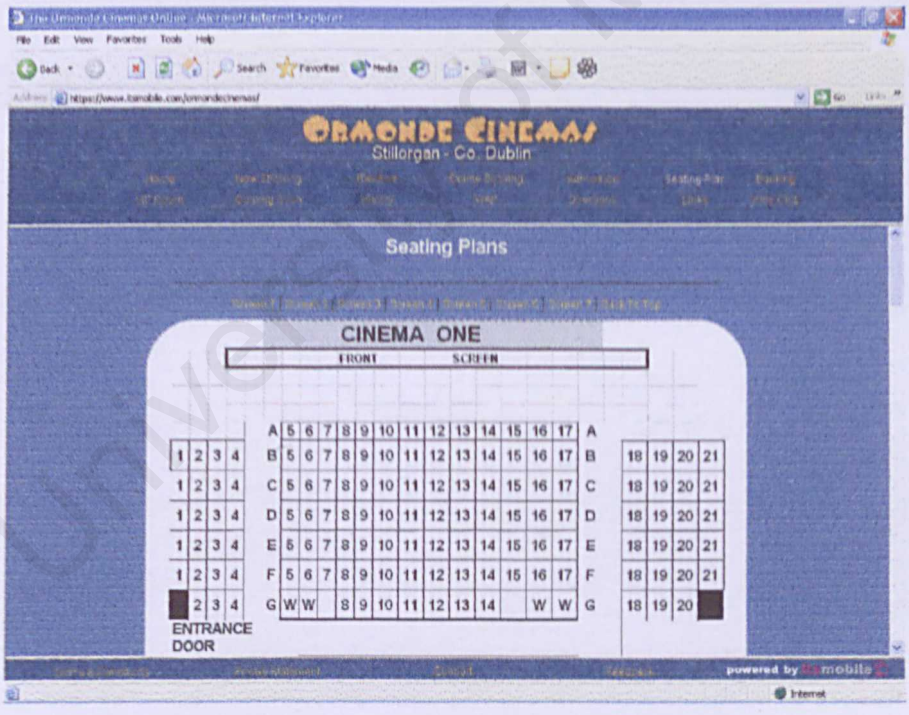


Figure 2.3: Seating plan to the Ormonde Cinema

Strengths:

- Simple design and mostly text-oriented make it fast to load.
- Online payment is available

- Seating plan is provided
- Direction of Ormonde Cinema is provided
- Trailer can be download
- New technology such as WAP is provided

Weaknesses:

- No FAQ is provided
- Poor site flow design – it takes too many step and long flow of pages to accomplish a single task.

2.1.2 Case study 2: *http://www.gsc.com.my*

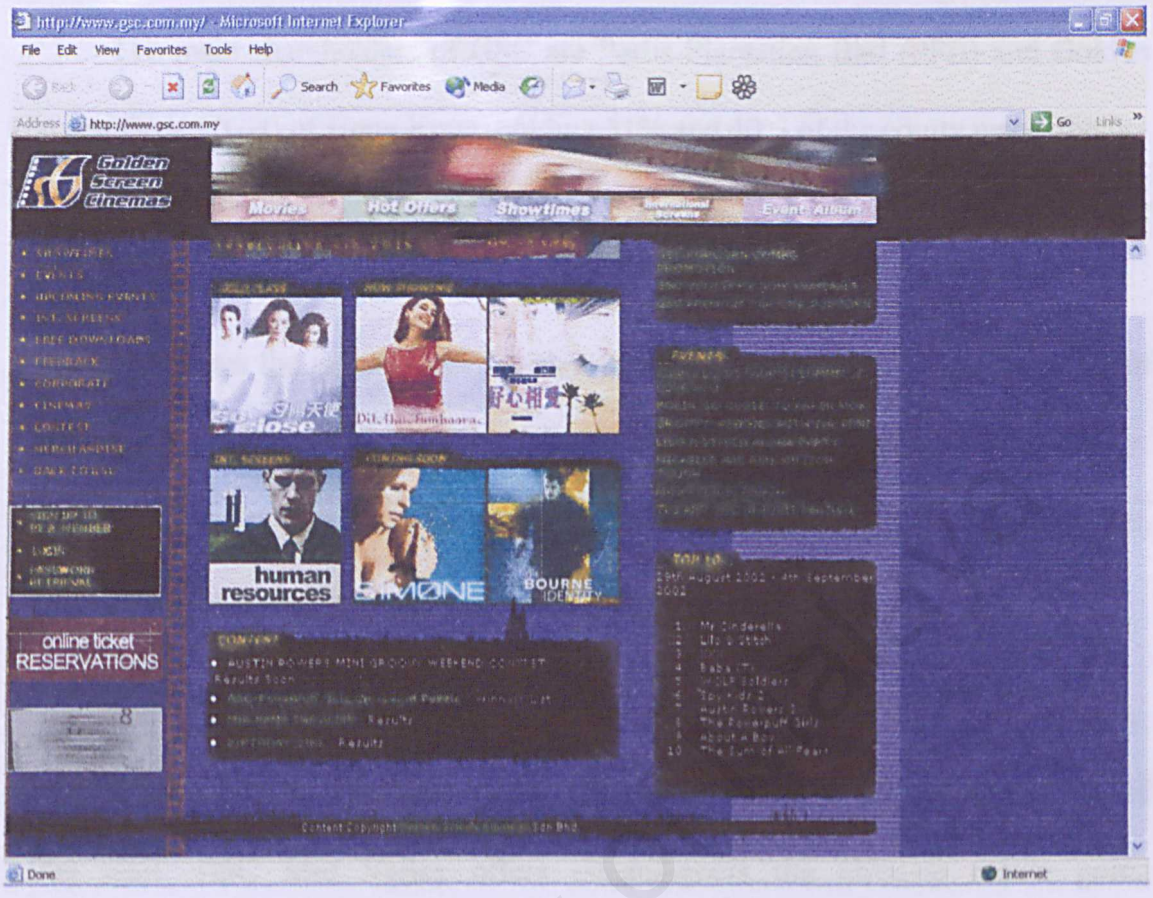


Figure 2.4: Main page of the GSC Cinema

Golden Screen Cinemas Sdn.Bhd. (GSC) is the leading film exhibitor and distributor in Malaysia.

GSC is a merger between the two giants of the Malaysian film industry, Golden Communications (M) Sdn Bhd (GCM) and Cathay Cinemas Sdn Bhd (CCSB). The merger has resulted in the biggest single entity in the Malaysian cinema entertainment business. This background not only brings with it more than 80 years of combined involvement in the cinema business, it also broadens and expands GSC's exhibition reach.

SHAREHOLDERS

The main shareholders of GSC are Perlis Plantation Bhd (PPB) and Golden Harvest Group (GH) of Hong Kong, holding 51% and 40% of the equity respectively.

FILM EXHIBITION

It operates the largest circuit with a total of 82 screens in 21 locations, all of which are located in prime sites in major cities and towns throughout the country, including Kuala Lumpur, Ipoh, Penang, Alor Setar, Seremban, Malacca, Johor Bahru, Kuantan and Kota Kinabalu.

The latest addition to the Golden Screen Cinemas circuit is GSC Mid Valley, the largest multiplex in Asia, with a total of 18 screens and a total seating capacity of 2,909 seats. GSC Mid Valley offers cinema-goers the ultimate movie going experience with the availability of full surround sound systems in all auditoriums, a premier Gold Class auditorium, International Screens and an AV convention auditorium.

FILM DISTRIBUTION

GSC is the biggest distributor of independent English films. GSC distributes films from independent companies such as Miramax, New Line Cinemas, PolyGram Film International, Largo, Kushner-Locke International, J&M Entertainment, Icon Entertainment, Fortissimo, Pandora, etc.

As for Chinese films, GSC is the main distributor, having distributed 9 of the top 10 movies in 1999. GSC's association with Golden Harvest goes back to more

than 10 years and GSC has played an active role in nurturing Jackie Chan's movie to the No. 1 Box- Office film over the last several years.

Some main modules of the site are as below:

- **Showtimes** module
- **Events** module
- **Upcoming events** module
- **International screen** module
- **Free downloads** module
- **Feedback** module
- **Corporate** module
- **Cinemas** module
- **Contest** module
- **Merchandise** module

2.1.2.1 Result of study

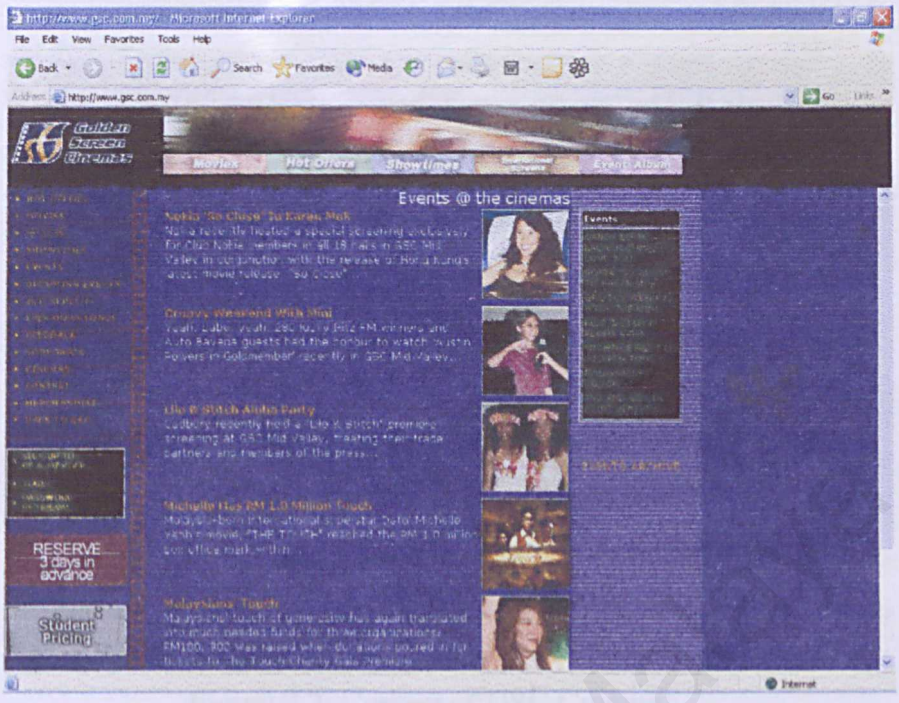


Figure 2.5: Events of GSC Cinema

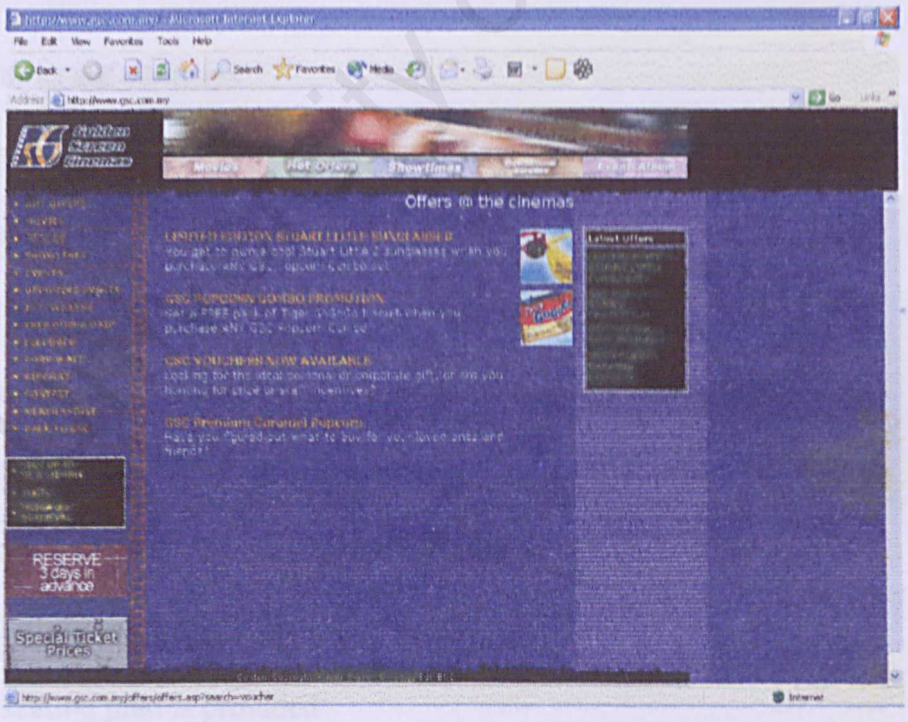


Figure 2.6: Offers of GSC Cinema

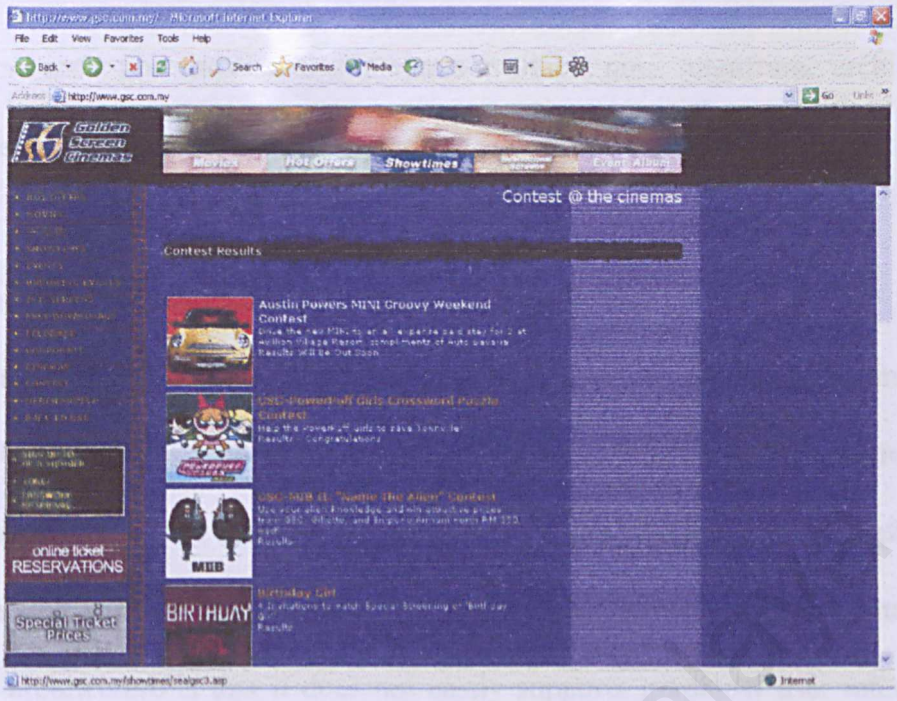


Figure 2.7: Contest of GSC Cinema

Strengths:

- Pictures are attractive
- Events and upcoming events are provided
- Promotion and announcement is provided

Weaknesses:

- No FAQ is provided
- Too many pictures, loading time quite long
- No online payment is provided
- No seating plan is provided

2.2 Software Architecture

There are a few software architectures available now: mainframe architecture, client-server architecture, two-tier architecture and three-tier architecture.

2.2.1 Mainframe Architecture

In mainframe system architecture, all operation is within the central host computer. User interacts with the host through a terminal that captures keystroke and sends that info to the host. Mainframe architecture is not tied to a hardware platform. User interaction can be cloning using PCs and UNIX workstations. A limitation of mainframe architecture is that it does not easily supports graphical user interface or accesses to multiple databases from graphically dispersed sites.

2.2.2 Client-server Architecture

Client

Client is a networked information requester, usually a PC or workstation that can query database and/or other information from a server. Clients rely on servers for resources, such as files, devices, and even processing power.

Server

Server is a computer, usually a high-powered workstation, a minicomputer, or a mainframe, that houses information for manipulation by networked clients. Server is dedicated to managing disk drives (file servers), database (database servers), printers (print servers), or network traffic (network servers).

Client-server

Client-server is a network architecture in which each computer or process on the network is either a client or a server. Client-server architecture implies a cooperative processing of requests submitted by a client, or requester, to the server, which processes the requests and returns the results to the client. The client manipulates the data and presents the result to the user.

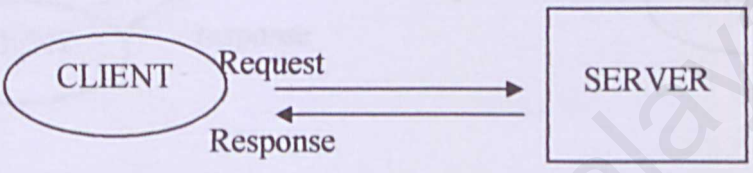


Figure 2.8: One-to-One Client Server

Client-server solutions can be in a many-to-one design that is more than one client typically makes requests of the server.

2.2.3 Two-Tier Architecture

2-tier architecture refers to client/server architectures in which the user interface runs on the client and the database is stored on the server. The actual application logic can run on either the client or the server. There are only the architecturally tiered data server and client.

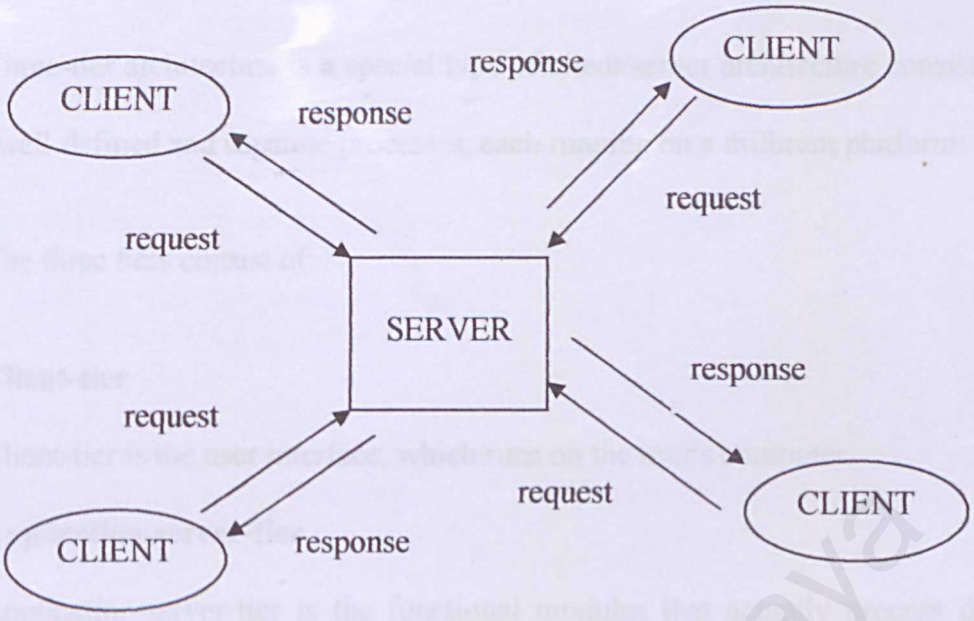


Figure 2.9: Many-to-One Client Server

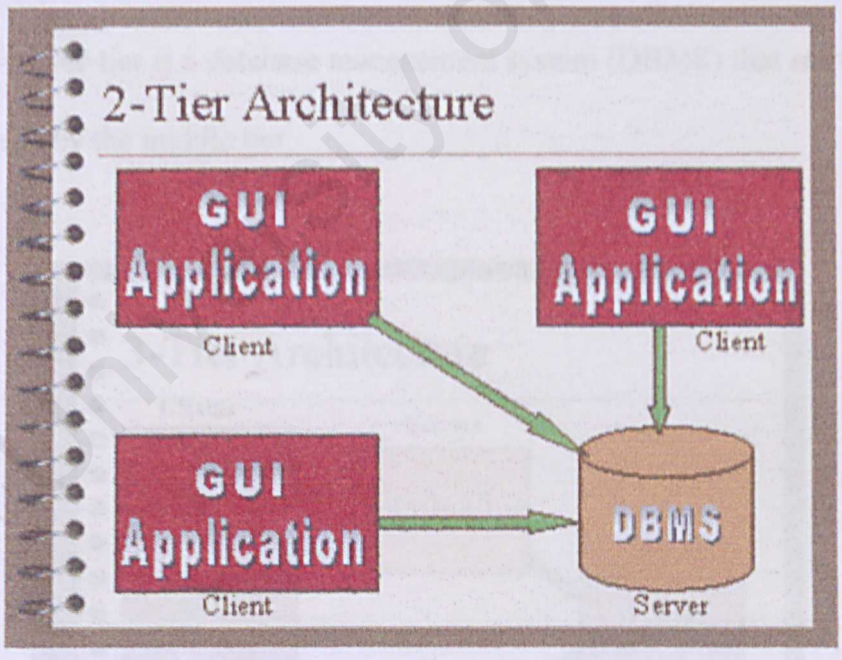


Figure 2.10: 2-Tier Architecture

2.2.4 Three-Tier Architecture

Three-tier architecture is a special type of client/server architecture consisting of three well-defined and separate processes, each running on a different platform:

The three tiers consist of:

1. **Client-tier**

   Client-tier is the user interface, which runs on the user's computer.

2. **Application-server-tier**

   Application-server-tier is the functional modules that actually process data. This middle tier isn't present in 2-tier architecture in this explicit form. This tier protects the data from direct access by the clients.

3. **Data-server-tier**

   Data-server-tier is a database management system (DBMS) that stores the data required by the middle tier.

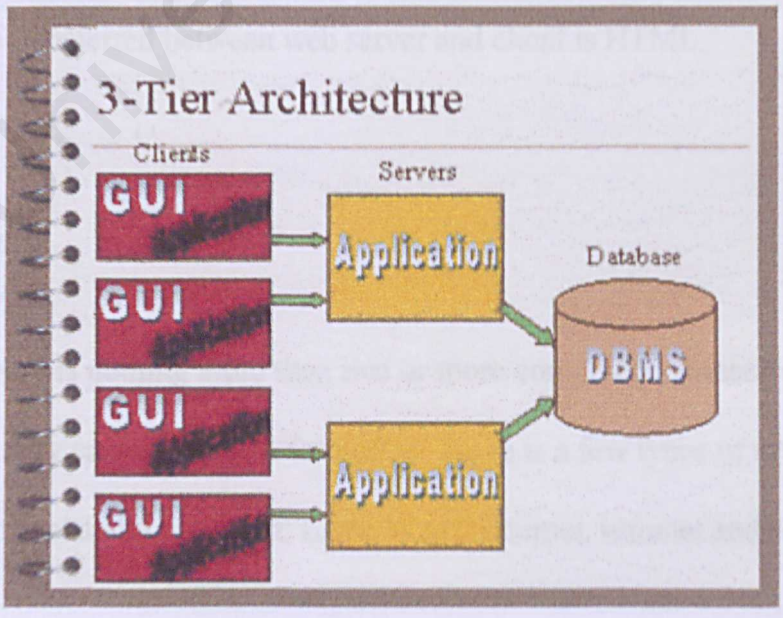


Figure 2-11: 3-Tier Architecture

2.2.5 Conclusion for Software Architecture

The three-tier architecture is chosen for this project because it is easier to implement and design. The three-tier design has many advantages over traditional two-tier or single-tier designs, the chief ones being:

- The added modularity makes it easier to modify or replace one tier without affecting the other tiers.
- Separating the application functions from the database functions makes it easier to implement load balancing.

In this project, the three tiers consists web browser as client-tier, web server as application-server-tier and database server as the data-server-tier. A web server can be defined as a computer program that receives HTTP requests from web browser for document. Web server will achieve and process the data from database server. Web server return both the document and the document type to the client so that the client knows what to do with the document or data once it is received. The most common document type transferred between web server and client is HTML.

2.3 Network

A network is nothing more than two or more computers connected together by a cable so that they can exchange information. There is a few types of network can be considered to be used in this project: LAN, WAN, internet, intranet and extranet.

2.3.1 Local-Area Network (LAN)

A LAN is a connection between two or more computers, which allows users to share files, programs, or data with a minimum of effort. A LAN is usually local; this means that the machines are located in one physical location -- like a building or just one floor of a building. A LAN tends to use just one set of networking options. For example, a LAN generally uses one network operating system, one type of cable, and one logical topology. A LAN is usually set up for a small group of people such as a department or a division. A LAN is not limited to any particular computer operating system. DOS, Macintosh, and UNIX can all run across a LAN. Actually, they can all run across the same LAN at the same time, if the right software is used.

2.3.2 Wide-Area Network (WAN)

While the geographic distinctions of "local" and "wide" area networks imply a difference in the distance between network nodes that is not always the case. By definition, a Wide Area Network (WAN) is a government-regulated public network or privately owned network that crosses into the public network environment. It doesn't matter whether the area being bridged is across the country or across the street. If the geographical separation crosses over a public thoroughfare, a WAN is required to make the connection.

The WAN is typically used to connect two or more local area networks (LANs). As you know, a LAN is a privately owned communications system that is designed to allow users to access and share resources (computers, printers, servers) with other users. LANs that are interconnected by a WAN may be located in the same geographical area, such as an industrial park or campus setting, or in geographically separate areas, such as different cities or even different regions.

2.3.3 Internet

Internet is a collection of communication networks interconnected across 2 or more LANs or sub-networks. It is a global network connecting millions of computers. More than 100 countries are linked into exchanges of data, news and opinions.

Each Internet computer, called a host, is independent. Its operators can choose which Internet services to use and which local services to make available to the global Internet community.

There are a variety of ways to access the Internet. Most online services, such as America Online, offer access to some Internet services. It is also possible to gain access through a commercial Internet Service Provider (ISP).

2.3.4 Intranet

Intranet is a term used to refer to the implementation of internet technologies within a corporate organization rather than for external connection to the global Internet. It is a network based on TCP/IP protocols (an internet) belonging to an organization, usually a corporation, accessible only by the organization's members, employees, or others with authorization. An intranet's Web sites look and act just like any other Web sites, but the firewall surrounding an intranet fends off unauthorized access.

Like the Internet itself, intranets are used to share information. Secure intranets are now the fastest-growing segment of the Internet because they are much less expensive to build and manage than private networks based on proprietary protocols.

2.3.5 Extranet

Extranet is a new buzzword that refers to an intranet that is partially accessible to authorized outsiders. Whereas an intranet resides behind a firewall and is accessible only to people who are members of the same company or organization, an extranet provides various levels of accessibility to outsiders. User can access an extranet only if user has a valid username and password, and user's identity determines which parts of the extranet user can view.

2.3.6 Conclusion for Network

Since this is an online system that may access by student nation wide, internet is the most suitable network to be used in this project. Users from different states can access the system if they have internet access. This means that users can keep in touch and get their lecture notes at anytime and anywhere despite of the limitation of geographical barrier.

2.4 Current online payment techniques

The most common online payment and have the widest coverage is the use of credits cards. A merchant account is required to accept credit cards. A merchant account is a special account with a bank that is a member of the Visa and MasterCard associations. Such a bank has been certified by Visa and MasterCard associations and can provide the merchant, with all of the services related to the merchant account.

Once the merchant account is setup and "live" on the credit card system, the merchant can accept credit cards from customers generally as follow:-

A customer presents their credit card for payment. Using their credit card number, the merchant submits an electronic request to the processing network for "authorization to capture funds" from the cardholder's credit card account in the amount of the purchase. Traditionally, one would submit this request by swiping a credit card through an electronic transaction terminal provided by the bank. With the system, this request is provided electronically to our payment gateway servers, which then route the request along the processing network. The processing network immediately receives the merchant's electronic request and determines if the cardholder's account is valid and if the funds are available. If they are, the processing network return an electronic response to the merchant's terminal or computer. This response is called an "authorization code", and is the merchant's guaranteed authorization to capture the funds. Typically, this code is a six digits number. The transaction and its associated authorization are stored in a "batch", where other transactions for that day reside. The merchant's prompt a receipt for the customer using the electronic terminal or the merchant's computer and the customer signs the receipt. As far as the merchant tare concerned, there is one more step to complete the transaction.

At the end of the business day (usually), a final request is submitted to the processing network to go ahead and "capture the funds" that the merchant obtained authorization for during the course of business that day. This is called "settlement" or "setting your batch". With a traditional physical credit card swipe terminal, this settlement process must be initiated manually. One of the key advantages of the system is that this settlement process is initiated automatically every day on their end.

On settlement line, the processing network immediately receives the merchant's response electronically and determines if the capture amounts contained in the merchant's request match the authorizations for each item. If so, the request is granted and an "Accepted" response is returned to the merchant's electronic terminal or computer. A settlement report can be printed showing the grand totals by card type (Visa, MasterCard, American Express, Discover, etc) for the settle batch.

Note: any corrections to the batch, such as voiding a transaction, must be made prior to settlement.

Within 48 to 72 hours (usually) the funds associated with the batch the merchant settled are deposited electronically into the merchant's business bank account. Typically, the discount rate the merchant's pay to the merchant account provider are deducted from the deposit before it transferred to the merchant's bank account, resulting in a "net deposit" of funds. At the end of the month, the merchant account provider will mail a statement to the merchant, detailing the credit card activity for the month and the associated fees have been charged for such. The customer also receives a monthly statement from his/her bank of the detailing account activity.

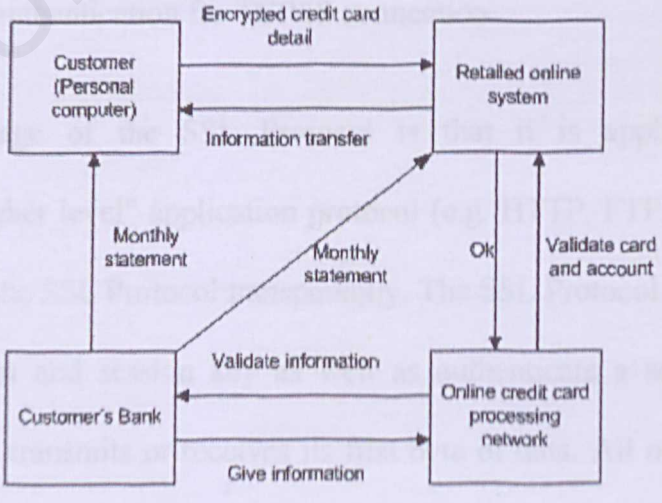


Figure 2.12: Illustrate the online credit card transaction

2.5 Security Technology

Security is an important part in developing a web site. Without a good security system, a web site can be hacked and make the user to loose confidence of web site. SSL is considered for securing the transport of information in DECP.

2.5.1 Secure Sockets Layer (SSL)

SSL is a security protocol designed to ensure data moving between a browser and a server remains private. In theory, someone could intercept information, such as a credit card number while it is in transit between the browser and the server. One solution to prevent information from being usable if it is intercepted is to encrypt it. The most widely implemented encryption system for the web at present is SSL.

SSL is an open, non-proprietary protocol developed by Netscape Communication. It uses industry, accepted RSA public key cryptography for authentication and encryption. The SSL protocol was designed to provide a data security layer between TCP/IP and application protocols such as HTTP, Telnet, NNTP or FTP. SSL provides data encryption, server authentication, message integrity and optional client authentication for TCP/IP connection.

The advantage of the SSL Protocol is that it is application protocol independent. A "higher level" application protocol (e.g. HTTP, FTP, TELNET, etc.) can layer on top of the SSL Protocol transparently. The SSL Protocol can negotiate an encryption algorithm and session key as well as authenticate a server before the application protocol transmits or receives its first byte of data. All of the application protocol data is transmitted encrypted, ensuring privacy.

2.6 Web Server

A Web server is a program that serves Web pages upon request. Every Web server has an IP address and possibly a domain name. For example, if an user enter the URL http://www.pcwebopedia.com/index.html in your browser, this sends a request to the server whose domain name is pcwebopedia.com. The server then fetches the page named index.html and sends it to the user's browser. Web servers and browsers communicate using HTTP (Hypertext Transfer Protocol), a simple but effective language for requesting and transmitting data over a network.

Web servers come in various shapes and sizes. They run under a variety of operating systems, have varying levels of power and complexity, and range in price from rather expensive to free. Studies on several web servers will be carried out: Apache, Microsoft Internet Information Server (IIS) and Personal Web Server (PWS).

2.6.1 Apache

Apache is a high-end enterprise-level server developed by a loosely knit group of programmers. The original version of Apache was written for UNIX, but there are now versions that run under OS/2, Windows and other platforms. Apache has become the world's most popular Web server. By some estimates, it is used to host more than 50% of all Web sites in the world.

The keys to Apache's attractiveness and popularity lie instead in the qualities listed above and its extensibility, its freely distributed source code, and active user support for the server. And version 1.3.0, now in official release, is already being touted as the most stable and fastest version of Apache ever.

Among the most notable features are its cross-platform support, protocol support (HTTP/1.1), modularity (API), security, logging, and overall performance and robustness. Apache distributes a core set of modules that handle everything from user authentication and cookies to typo correction in URLs.

2.6.2 Internet Information Server (IIS) v5.0

IIS is the best Web server available for Windows NT. This version, which comes exclusively as part of the Windows 2000 Server operating system, contains many new features along with performance and reliability enhancements.

IIS v5.0 is good as both a first-time Web server for those familiar and comfortable with Windows operating systems, and a high-end server for hosting providers and large corporate installations. It handles the basics well and is better integrated in Windows than previous versions. IIS v5.0 also comes with performance and feature enhancements that will be attractive for mission-critical tasks.

The ideal computer to run IIS on is at least a 200 MHz Pentium with 128 MB of RAM. Organizations should plan on doubling the RAM and CPU speed if they intend to run Advanced Server's clustering, SQL or Transaction services on the same machine as the Web server.

2.6.3 Personal Web Server (PWS)

PWS is entry-level/mid-range server for Windows 9x/NT platforms. It is a scaled-down version of the commercial Information Internet Server (IIS) included with the Server edition of Microsoft Windows NT. PWS is a great entry-level Web

server that makes it easy to publish personal home pages, serve small Web sites, and share documents via a local intranet.

PWS is one of the best servers available for helping to get users up and running quickly. Wizards are included to guide users through the process of setting up home pages and sharing files, and the PWS administrator reduces the complexity of actually running the Web server itself. Users can also use the familiar Explorer interface or PWS's Personal Web Manager to share directories, start and stop the server, and view Web site statistics.

One of the best uses for PWS is as a platform for testing out Web sites on Windows 95/Windows NT Workstation computers before hosting them on the Internet. This allows users to check the validity of links, scripts, and applications as well as to ensure that the overall organization of the site is functioning correctly.

PWS presents the ability to develop transactional Web applications using the Microsoft Transaction Server. Overall, while most large enterprises will likely bypass Microsoft's Personal Web Server for the high-end Internet Information Server, PWS will remain one of best available options for individuals wanting to serve their own personal home pages and for small organizations needing to host their own Web sites.

2.7 Operating System

Operating system (OS) is a platform that performs basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk, and controlling peripheral devices such as disk drives and printers.

Besides that, the OS makes sure that different programs and users running at the same time do not interfere with each other. For security, OS ensures that unauthorized users do not access the system. OS provides a software platform to allow application programs run on it.

The most popular operating systems currently are UNIX, Windows 98, Linux and Windows 2000.

2.7.1 UNIX

UNIX is a much older operating system that was created in the late 1960s. UNIX is designed to provide a multi-user, multitasking system for use by programmers. It began as an open source project that became widely used in Universities, scientific labs, and by the U.S. government. The philosophy behind the design of UNIX was to provide simple and powerful utilities that could be pieced together in a flexible manner to perform a wide variety of tasks. Over the years, hundreds of talented programmers contributed their own improvements to Unix making it extremely robust, stable, and fast.

However, UNIX is more difficult to learn and isn't as widely supported as Microsoft Windows 2000.

2.7.2 Windows 98

Windows 98 is based on the popular Microsoft Windows 95 Operating System, and is designed for the consumer market. Windows 95/98 were designed for backward compatibility with older DOS and 16bit programs, as well as providing a platform for the newer (back in 1995) 32 bit programs.

Windows 98 works better by making it simple to access the Internet and by providing better system performance along with easier system diagnostics and maintenance. With Windows 98, users' system plays better as well with support for the latest graphics, sound, and multimedia technologies, the ability to easily add and remove peripheral devices with support for Universal Serial Bus (USB), and it also enables users to watch TV on PC. Besides that, Windows 98 is compatible with more software (including games) and hardware.

2.7.3 Linux

Linux has gradually become a popular operating system for Internet/ intranet serving purposes. With a host of performance enhancements that will benefit Web sites and Internet sites of all sizes, Linux is a stable and high-performance operating system for Internet usage.

Linux has made progress, primarily in functionality important to Internet infrastructure and Web server capabilities, including a greater selection of drivers, easier installation, GUI-based front ends for Web administration and window management.

2.7.4 Windows 2000

Windows 2000 is Microsoft's latest version of popular Windows NT Operating System. Windows 2000 Server has big improvement over Windows NT 4.0. The changes, both fundamental and cosmetic, have made Windows 2000 faster, more reliable, heavier-duty, and easier to use.

2.8 Database Server

A database is a structured collection of data. To add, access, and process data stored in a computer database, a database server is needed. There are several database servers available currently: Oracle, PostgreSQL and MySQL.

2.8.1 Oracle

Oracle is a multi-user database. It provides unprecedented ease-of-user and is pre-tuned and pre-configured for today's dynamic workgroup and line-of-bus environment.

Oracle includes a fully integrated set of easy-to-use management tools, full distribution, replication and web features. Oracle also provides the highest levels of availability through fast failover, easier management, and zero data loss disaster protection, with Data Guard, the only complete data protection solution available on the market.

Oracle can runs on UNIX, Linux and Windows platform. However, it is expensive and separate licenses are required for each of its database engine.

2.8.2 PostgreSQL

PostgreSQL is a sophisticated Object-Relational DBMS, supporting almost all SQL (Structures Query Language) sconstructs, including subselects, transactions, and user-defined types and functions. It is the most advanced open-source database available anywhere.

PostgreSQL is an enhancement of the POSTGRES database management system, a next-generation DBMS research prototype. While PostgreSQL retains the powerful data model and rich data types of POSTGRES, it replaces the PostQuel query language with an extended subset of SQL. PostgreSQL is free and the complete source is available.

PostgreSQL runs on Solaris, SunOS, HPUX, AIX, Linux, Irix, FreeBSD, and most flavours of Unix.

2.8.3 MySQL

MySQL is a relational database management system. MySQL stores data in separate tables rather than putting all the data in one big storeroom. This adds speed and flexibility. The tables are linked by defined relations making it possible to combine data from several tables on request.

MySQL is a small, compact, easy to use database server, ideal for small and medium sized applications. It is client/server implementation that consists of a server and many different client programs. It is available on a variety of UNIX platforms, Linux, Windows NT, Windows 95/98 and Windows 2000.

MySQL is Open Source Software. Open Source means that it is possible for anyone to use and modify. Anybody can download MySQL from the Internet and use it without paying anything. Anybody can study the source code and change it to fit their needs.

2.8.4 Microsoft SQL Server

Microsoft SQL Server 7.0 is a single process, multithreaded relational database server primarily intent for transactional processing. It is based on the client/server architecture, which divides processing into two components: a front-end, or client component, that run on a local workstation and a back-end, or server component that runs on a remote computer.

2.9 Data Access Technology

CTS will require data access technology to enable communication and access to its various databases. A few of the Microsoft Data access strategy and technology is reviewed and considered.

2.9.1 Universal Data Access (UDA)

UDA is a high-level specification developed by Microsoft for accessing data objects regardless of their structure. The strategy of Universal Data Access is to assure open, integrated, standards-based access to all types of data that is from SQL to non-SQL to even unstructured data across a wide variety of applications, from

traditional client/server to the web. The main components of UDA are ADO, OLE DB and ODBC.

2.9.2 ADO (Active Data Object)

Active Data Object (ADO) is the Microsoft's newest high-level interface for data objects that most applications developers will use.

ADO is designed to eventually replace *Data Access Objects (DAO)* and *Remote Data Objects (RDO).* Unlike RDO and DAO, which are designed only for accessing relational databases, ADO is more general and can be used to access all sorts of different types of data, including web pages, spreadsheets, and other types of documents.

ADO provides consistent access to data for creating a front-end database client or middle-tier business object using an application, tool, language, or even an Internet browser. ADO is the single data interface for developers creating 1 to n-tier client/server and Web-based data-driven applications.

2.9.3 OLE DB

OLE DB Providers are the data access engines or services, as well as the business logic components that these applications can use in a highly interoperable, component-based environment.

OLE DB is a set of interfaces that are designed to provide data access to *all* data, regardless of type, format or location. It effectively "componentizes" database and related data processing functionality, breaking it up into interoperable components that can run as middleware on the client or server across a wide variety of

applications. The OLE DB architecture provides for components such as direct data access interfaces, query engines, cursor engines, optimizers, business rules and transaction managers.

The concept of OLE DB is to explode the database into its basic parts. OLE DB delivers components, external to the database, that provide this typical database functionality in a reusable component architecture. And these components, because they are not directly linked to the database itself, can be shared across multiple applications, systems and data stores to provide a higher level, universal interface.

2.9.4 ODBC (Open Database Connectivity)

ODBC is a standard database access method developed by Microsoft Corporation. The goal of ODBC is to make it possible to access any data from any application, regardless of which database management system (DBMS) is handling the data. ODBC manages this by inserting a middle layer, called a database *driver* , between an application and the DBMS. The purpose of this layer is to translate the application's data queries into commands that the DBMS understands. For this to work, both the application and the DBMS must be *ODBC-compliant* -- that is, the application must be capable of issuing ODBC commands and the DBMS must be capable of responding to them. Since version 2.0, the standard supports SAG SQL.

2.9.5 JDBC

JDBC technology is an API that lets you access virtually any tabular data source from the Java programming language. It provides cross-DBMS connectivity to a wide range of SQL databases, and now, with the new JDBC API, it also provides access to other tabular data sources, such as spreadsheets or flat files.

The JDBC API allows developers to take advantage of the Java platform's "Write Once, Run Anywhere" capabilities for industrial strength, cross-platform applications that require access to enterprise data. With a JDBC technology-enabled driver, a developer can easily connect all corporate data even in a heterogeneous environment.

2.10 Language

2.10.1 ASP

ASP is a server-side scripting technology. ASP is indeed HTML page with an .asp extension. ASP allows for HTML and a scripting language such as VBScript, JScript or Perl to be interspersed in a Web page. When a browser requests an ASP page, the Web server generates a page with HTML code and sends it back to the browser.

One of the most important features about ASP is that it allows user to easily access data and put it on a Web page. User can simply display data from an ODBC-compliant database, or use ASP to make decisions about what to display on a Web page. User can then format the results in any way that they please.

Another important ASP feature is the ability to use cookies to store and retrieve information. The Request object has a Cookie collection, and user can use this in data processing.

2.10.2 PHP

PHP Hypertext Preprocessor is a open-source server-side, HTML embedded scripting language used to create dynamic Web pages for e-commerce and other Web applications. In an HTML document, PHP script (similar syntax to that of Perl or C) is enclosed within special PHP tags. Because PHP is embedded within tags, the author can jump between HTML and PHP (similar to ASP and Cold Fusion) instead of having to rely on heavy amounts of code to output HTML. And, because PHP is executed on the server, the client cannot view the PHP code.

PHP offers excellent connectivity to most of the common databases (including Oracle, Sybase, MySQL, ODBC and many others). PHP also offers integration with various external libraries, which allow the developer to do anything from generating PDF documents to parsing XML.

PHP is the natural choice for developers on Linux machines running Apache server software, but runs equally well on any other UNIX or Windows platform, with Netscape or Microsoft Web server software. PHP also supports HTTP sessions, Java connectivity, regular expressions, LDAP, SNMP, IMAP, COM (under windows) protocols. It also supports WDDX complex data exchange between virtually all Web programming languages.

2.10.3 ColdFusion

ColdFusion is a product created by Allaire Corporation of Cambridge, Mass. that includes a server and a development toolset designed to integrate databases and Web pages. Cold Fusion web pages include tags written in Cold Fusion Markup Language (CFML) that simplify integration with databases.

Coding for ColdFusion pages is much more straightforward and intelligible than JavaScript, VBScript, C++ or Java, even while providing high levels of functionality. The tags themselves conform to the basic HTML syntax of tag name followed by tag attributes, and are enclosed in the familiar HTML brackets (<>). Most tags are two-sided, and can be combined with each other and with HTML elements to create custom tags for use in ColdFusion applications.

2.10.4 JSP (JavaServer Pages)

JavaServer Pages™ (JSP) is a web-scripting technology that can mix static HTML content with server-side scripting to produce dynamic output. By default, JSP uses Java as its scripting language; however, the specification allows other languages to be used, just as ASP can use other languages (such as JavaScript and VBScript). While JSP with Java will be more flexible and robust than scripting platforms based on simpler languages like JavaScript and VBScript.

JSP provides a number of server-side tags that allow developers to perform most dynamic content operations. So developers who are only familiar with scripting, or even those who are simply HTML designers, can use JSP tags for generating simple output. Advanced scripters or Java developers can also use the tags, or they can use the full Java language if they want to perform advanced operations in JSP pages.

2.10.5 Javascript

Javascript is a scripting language developed by Netscape to enable web authors to design interactive sites. Javascript is different from Java. Although it shares many of the features and structures of the full Java language, it was developed independently.

Javascript can interact with HTML source code to enable web authors to spice up their sites with dynamic content. JavaScript is endorsed by a number of software companies and is an open language that anyone can use without purchasing a license. It is supported by recent browsers from Netscape and Microsoft, though Internet Explorer supports only a subset, which Microsoft calls Jscript.

2.10.6 Microsoft Visual Basic 6.0

The first review is Microsoft Visual Basic 6.0. Its standard module enables production of stand-alone applications. It combines RAD and object-oriented programming.

The new tools are built on ActiveX Data Objects (ADO) 2.0, Microsoft's Standard high-level interface for data access. This has a simple object model, a common user interface for local and remote data access, support for hierarchical record sets and accessible data binding.

ADO components are created during development by dragging the required data elements, such as tables, views and fields from the new Data Environment Designer into screen forms to create data bound objects. The Data Environment Designer is used to define your project's data sources, and the tables, views and stored procedures that are available from each source. These can then be dragged into the appropriate positions on your forms.

Microsoft Visual Basic 6.0 was also an interpreted language system, so users could test and debug application on the fly from within the development environment.

Advantages:

- Component-based development aids and database access model

- Server-side transaction support
- Integration with web clients

Disadvantages:

Performance remains second rate compared with C++ and other fully compiled language

2.11 Authoring Tools

2.11.1 Microsoft Visual InterDev

Microsoft Visual InterDev is a Web development tool designed for programmers to create an interactive Web page with data is as simple as dragging and dropping, setting some properties, and saving the page. No coding is required in using Visual InterDev.

Visual InterDev includes site design tools that help user easily plan pages, organize their links, and apply a consistent theme to your Web site. Visual InterDev includes three ways to view your HTML and ASP pages.

These three views are the cornerstone of Visual InterDev. They replace the simple source code editor included with Visual InterDev 1.0 and supports design-time controls (DTCs), debugging, statement completion, and object browsing.

The new data environment provides easy commands for making Web application data-driven. Instead of burying complex SQL statements deep within an .asp file, the statements are now exposed, maintained, and reused at the application

level through the data environment under the Global asp file. Instead of modifying the query within each page, developers can modify the data command and changes are incorporated into files that reference that data command. Developers also can drag fields from the command directly onto HTML or ASP page.

However, for those so inclined, Visual InterDev exposes a full object model that allows developers to fine-tune their application, perform client validation, and have full control of Web application. Visual InterDev supports not only full-reach applications, using the ASP engine to produce simple HTML pages for the client, but also DHTML and Microsoft Internet Explorer 4.0 data binding for a richer client experience.

2.11.2 Notepad

Notepad is the world's most versatile HTML editing tool absolutely free when purchase this software: Windows version 2.0 and above.

Notepad has one of the simplest user interfaces of any Internet Web authoring tools. The menus are logically laid out, conforming to all standards in design, so users can understand them before use Notepad.

Notepad has the same interface for all versions of Windows, so moving over to the latest version of Windows should not hamper HTML code creation. The Notepad web-authoring tool is compatible with every single standard of Internet presentation medium yet devised. Notepad was designed to have a very small application footprint, taking up as little space as possible in computer's memory, and a minimum of disk space.

Notepad gives clear, easy to read and full HTML. There is no code hidden, and users have control over all parts of the HTML code. JavaScript is also fully supported by Notepad. All parts of the JavaScript are fully available through Notepad, without the need of complex tools.

2.11.3 EditPlus

EditPlus is an Internet-ready 32-bit text editor, HTML editor and programmer's editor for Windows. While it can serve as a good replacement for Notepad, it also offers many powerful features for Web page authors and programmers.

EditPlus supports powerful and customizable syntax highlighting for HTML, CSS, PHP, ASP, Perl, C/C++, Java, JavaScript and VBScript by default. Also, users can create their own syntax file to support other programming languages, such as ASP, Java and PHP.

EditPlus includes features:

- Internet features

  Seamless web browser for previewing the content of HTML document or Java applet without leaving the editor. Browser window also has common browser commands so users can browse Internet web sites as well as local HTML files. FTP commands for uploading local files to FTP server or for editing remote files directly. Highlights URL and e-mail addresses in normal text files and lets you activate them with a single keystroke (F8) or 'Ctrl + double-click'.

- HTML toolbar

The HTML Toolbar allows users to insert common HTML tags quickly and easily. It also supports useful tools such as HTML Color Picker, Character Picker, Table Generator and Object Picker.

- Document selector

  The Document Selector offers quick mouse access to all document windows currently loaded. Much faster than selecting on Window menu or pressing Ctrl+Tab key multiple times.

- User tools

  EditPlus supports user-defined tools, help files and keystroke recording files. The output of tool execution can be captured in the Output Window, so that users can double-click the error line to automatically load the file and locate the cursor to that line.

- Auto-completion

  Auto-completion is a timesaving feature, which changes a short abbreviation into a complete string. It supports Perl and C/C++ by default. Also, users can create their own auto-completion file to support other programming languages.

- Cliptext window

  The cliptext window is collection of text clips for quick and easy access. Users can easily customize them, and can also create on cliptext file.

- Document template

  Document template offers a quick start when create a new document.

2.11.4 Macromedia Dreamweaver

Macromedia Dreamweaver is professional visual editor for creating and managing web sites and pages. It gives developers the productivity of a visual web

page layout tool, the control of an HTML text, editor and support for new web technologies, all in one software packing.

Developers can use it to create web sites visually, with confidences that HTML being generated is concise and always editable. It includes advanced features that takes advantage of the latest innovations on the web, such as dynamic HTML and CSS, while still ensuring that web pages work well in a variety of web browsers. All of the code generated by it is carefully created to work on as many platforms and browsers as possible.

Others features include easy integration of Active X components, Java applets, Plug-ins for improved web page interactivity. It also integrates seamlessly with other components of Macromedia, such as Flash Movies, Shockwave, and Fireworks, which are essential for the development of interactive web pages.

2.11.5 Adobe Photoshop

Adobe Photoshop is the most popular image-editing available for Macintosh and Windows-based computers. It is used as drawing, painting and designing purposes. Users can retouch an image, apply special effects, swap details between photos, introduce text and logos, adjust color balance, and even add color to a grayscale scan. All these functions are included under a set of user-friendly editing tools in Adobe Photoshop. It contains graphical icons to represent every functions of each button. Besides that, it also provides many shortcut keys that is easier and save time for users and for those who do not like to use mouse.

Chapter 3

System Requirements Analysis

Chapter 3 - System Requirements Analysis

3.1 Methodology

The system development methodology is a method to create a system with a series of steps or operations or can be defined as system life cycle model. Every system development process model (see Figure 3.1) includes system requirements (user, needs, resource) as input and a finished product as output.

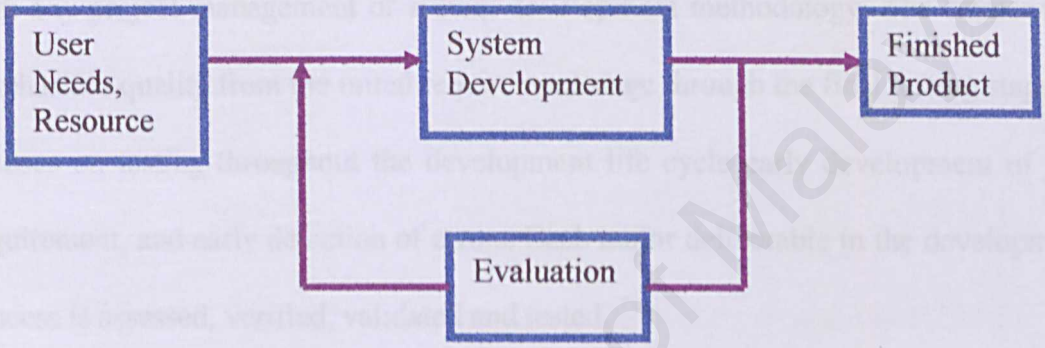


Figure 3.1: System Development Process Model

There are several process models in system development:

1. Waterfall Model with prototyping
2. V Model
3. System Development Life Cycle (SDLC)
4. Spiral Model

3.2 Project Model

The main objectives to a system development methodology are to make sure that all objectives progress and problems can be detected during the development.

After planning, a process model is identified for the development of this proposed project. The conventional model for system development is the standard "Waterfall Model". But specifically in this system, the preferable model is the 'V' Model, an evolutionary model from the "Waterfall Model" enhanced with prototype.

3.2.1 V Model Overview

The V Model frame work is a structured testing approach that can be used with any project management or system development methodology. The framework emphasizes quality from the initial requirement stage through the final testing stage. It focuses on testing throughout the development life cycle early development of test requirement, and early detection of errors. Each major deliverable in the development process is assessed, verified, validated and tested.

Verification - checks that a deliverable is complete (contains all requires information follow standards)

Validation - checks that the deliverable satisfies requirement specified in the previous stage or an earlier stage, and that the business case is met.

Testing - ensures that the specification is properly assembled and implemented.

The deliverable of each stage need to be verified and validated to ensured that they are complete and correct. Work proceeds to the next stage in the V Model when all project deliverables in a stage have met all verification and to catch as many as possible within the development life cycle, otherwise know as "stage containment". Each successive stage testing ensures that the specifications defined in the deliverable

of the corresponding stage have been implemented. This is achieved by the early development of test requirements.

3.2.2 V Model Description

1. Business case

   The goal of the business case is to define the opportunity and reasons why management may accept the undertaking of a system development or enhancement project. These business case objectives and descriptions provide the basis for the business assessment.

2. Business scope assessment

   The goal of the business assessment is to develop an assessment of the gap between the original business need and the correct systems environment, including identification of each affected system. These high level business requirements provide the basis for the conceptual design.

3. Functional requirement definition and functional design

   The goal of the functional design is to develop specific functional and technical requirement for all impacted functionality. The specific functional and technical requirement provides a basis for the detailed design.

4. Detailed (Technical Design)

The goal of the detailed design is to develop detailed programs specifications derived from the technical requirement. The detailed programs specifications provide the basis for all build activities.

5. Component/Unit test

   The goal of the component test is to code and test changes of an individual module, program, or component, to demonstrate that the work package implements the requirement according to the design specification. The component testing includes unit test and client/server testing (more of a technical test nature).

6. Application test

   The goal of the application test is to deliver an application of functionality defined set of system components that satisfy all design requirements. That is, by which the pieces of the unit testing functionality are strung together to complete the assembly test process.

7. System integrated testing

   The goal of the integrated test is to confirm that working application or group components can be fully integrated to satisfy functional, technical and quality requirements. Stress testing is another element that may be performed during this cycle.

8. User acceptance testing

The goal of the integrated test is to confirm that the systems will function within the business environment. Formal sign-off is included in this stage.

3.2.3 The reasons of the chosen V Model

The reasons of the chosen V model is because

- It forms a common understanding of the activities, resources and constraints involved in the software model are realistically than any other model.
- Easier to detect inconsistencies, redundancies, and omissions in the process and in constituent parts. As these problems are noted and corrected, the process becomes more effective and focused on building the final system.
- Reflects the goals and objectives of the system, such as building a high quality business model, finding faults early in the development, and meeting the required budget and schedules constraints.
- Ideal development models that stressing testing.
- The problem of unclear requirements could be exacerbated by the possibility of "freezing" requirements (a characteristic of this waterfall derivative model)
- The likelihood of maintenances; to ensure that the project is well structured and documented if enhancing and adapting it in future.

The purpose of the enhanced prototype in this V Model acts as a sub process towards the development. It focuses on understanding and confirming the functional requirements at the systems. From here, it is easier to evaluate candidate activities for their appropriateness in addressing the system goals. It is able to identify special situations that might occur in the system later on so the system can also be tailored to these situations if it occurs. The type of preliminary prototype is throw-away

prototype. This prototype would be used during the prior stages of development- identifying requirements, system design and backbone of the system development. It then will be discarded during the final stages of development and not be used in the real CTS.

The use of the V Model will look more prominent in the later phases after the development design. The later phase acts on confirming and modifying the requirement and design phases to produce a quality business model.

Advantages of the V Model

- Clear sign-off at the end of each phase helps planning and progress monitoring by the client, who is likely to be concerned about timeliness in a high-profile project such as this.
- A waterfall like process may encourage a well-structured product, improving ease of maintenance. This is important, given the long lifespan of the product and the likely need to perform adaptive and prefecture maintenance in future.
- The prominence given to testing helps to ensure that delivered product will satisfy acceptance tests. Again, given the high profile for the project, this is likely to be of value to us.

Disadvantages of the V Model

- This is a waterfall derivative - the need to sign off development products including the SRS may make it difficult or expensive to meet changing requirements if they arrive at a late stage. The scenario stats that the requirements are unclear, and so we should devote considerable effort to getting the requirements clear before embarking on later development. Use of

throw-away prototyping in the requirement analysis stage could be recommended.

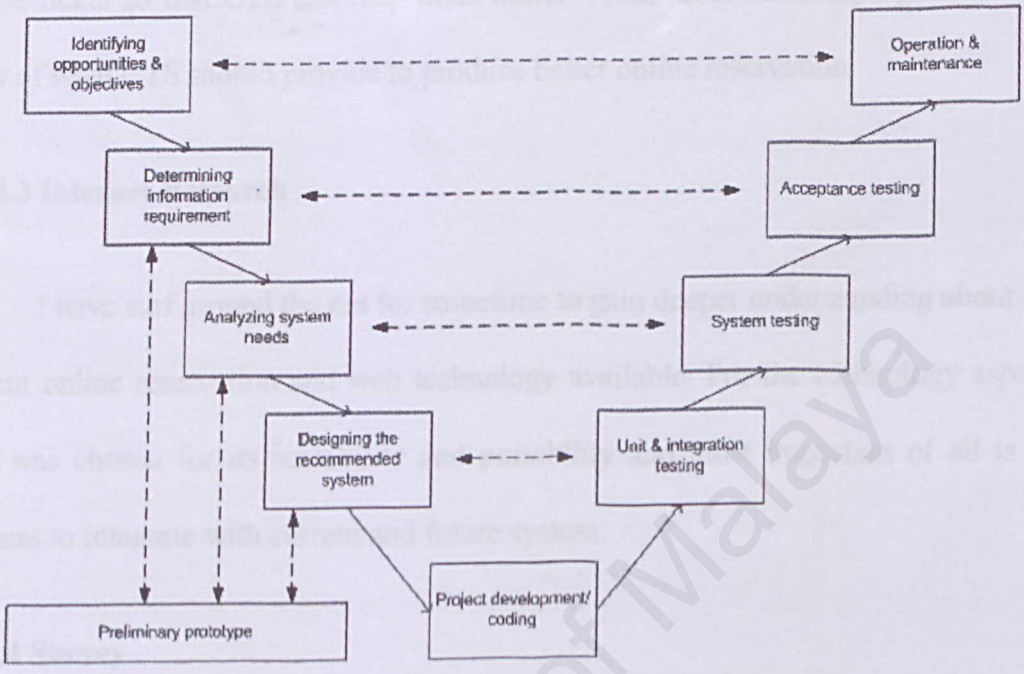


Figure 3.2: V Model with Prototyping

3.2.4 Techniques Used To Define Requirements

Effective and appropriate techniques must be used to define and elicit user's requirements. Research methods that usually used are library research, interview, internet research and survey.

3.2.4.1 Library Research

I went to library to search books related to online system to have a deeper understanding on online system design and how does an online system be implemented effectively?

3.2.4.2 Interviewing moviegoers

A few interview sessions had been conduct with some moviegoers at cinema to have better understanding of their need toward the online reservation and buy movie ticket so that CTS can help them better. From those sessions, I got a clearer view of what CTS should provide to produce better online reservation.

3.2.4.3 Internet Research

I have surf around the net for sometime to gain deeper understanding about the current online reservation and web technology available. For the technology aspect, ASP was chosen for its scalability and portability and most important of all is its easiness to integrate with current and future system.

3.2.4.4 Survey

In order to make my survey success, I have prepared 30 sets of questionnaire (see Appendix). My respondents are students in the campus who use the system. The objective of my questionnaire is to find out what problems they have with the current system and how can I improve it.

The respondents were asked to answer the questionnaire on the spot to ensure I can get back all the sets of questionnaire. Each of them took not more than 10 minutes to answer the questionnaire.

After collecting all the questionnaires, I analyze the data and identified some major problem as below:

- There is no seating plan provided, so they can't choose their seat.
- They also can't view the available of the seat.
- Reservation of the movie ticket becomes least unreliable.

- There is no user instruction and FAQ provided, so when they meet problem, they don't know how to do.
- The entire local cinema website did not provide online buy movie ticket.

3.2.4.4 Summary of User Requirements

From the research above, I found that to have a more reliable and efficiency online reservation movie ticket for a cinema organization, they have to provide the seating plan for customer to choose their seat, online payment to buy the movie ticket, simple and clear user instruction and FAQ provided. Below is the enhancement of the current local cinema website:-

- Provide seating plan for user to choose their seat.
- Provide online payment for user to buy movie ticket with several choice of online payment.
- A well manage of room theatre, seat, movie show time and ticket price.

3.3 Functional Requirements

Functional requirement is a statement of the service or functions that a system should provide how the system reacts to particular inputs, and how the system should behave in particular situations. **[Sommerville, 1998]**

The functional requirement for CTS consists of three main parts:-

- Customer administration module
- Staff administration module
- Manager administration module

3.3.1 Customer administration module

User Authentication and Authorization

First time customers who would be using the CTS system will have to register first. Required information has to be keyed in for the administration records. One of the most essential information that has to be supplied by the user is their login name and password. These are the security measurements that have to be taken. With this, validation and verification of users is a symbol of authentication and authorization. From here, the customer can proceed to the next level of interface.

Customer main menu interface

The customer will be presented with options. The customer will be able to view and browse the movie catalogue of the current available show time. The other application options are:-

- Make a reservation/book reservation
- Modify/update profile
- Promotion and announcement
- Feedback/message
- Logout

Browse movie catalog and movie description

The customer will have the liberty to view and browse the current available movies in the cinema. From the catalog, links will be provided to the customer so that the customer will have the opportunity to inquire information about the movie such the movie synopsis, trailer and cast.

Reservation information

This is where the reservation is initiated. The customer will fill in required information. This information consists of personal information of customer with related information, movie title, show time, and date. The others essential information is reserved seat of the specified room and total of tickets with price total.

Transaction information

The customer will be able to use all the information related to their reservation after they have entered the above mentioned details. This information consists of the movie title desired, room number, show time, data, seating and ticket price. Afterwards, the customer will be required to enter mode of payment; credit card number or prepaid payment to finalize or cancel the reservation process.

Transaction Number

The transaction number is given to the customer upon finalizing their reservation. This number with the reservation information will be displayed in a ticket coupon format and the customer has to print this temporary ticket for exchange with a real ticket at the box-office ("Advanced-Booking" counter). This number was also be used to view their booking at a later time.

Modify/Update information

CTS allow changes to be made to the profile of the valid user. If customers wish to e.g. new phone number, address or email.

Feedback/Help

This is a guide for users to use CTS and collect the responds from customer about system.

Promotion and Announcement

This option provides the promotion and announcement to the customer.

3.3.2 Manager/Administration administration module

For security and policy purpose, there is a need to distinguish between regular staff and managers of CTS. The login process is the same for manager as that for staff; however managers will have access to exclusive extra features.

Manager main menu

In addition to staff abilities, the managers will have access to exclusive features. There features include movie show time management, room management, accessing managerial statistics, and overriding cancellation for customer reservations.

Movie show time management

While viewing a list of show time, the managers have the ability to add movies, remove movie or change movie or room schedules.

- Add movies

  Adding movie is simple process that requires the manager to enter all movie related information so that CTS can then add it to the database. This information includes such things as the movie description, type of movie, dates and times.

- Remove movies

This task involves selecting a movie from the displayed list, and confirming the option choice to remove it.

- Change movies schedule

  Similar to remove movie, the movie must be selected, and it can then be modified. The only information that can be changed by CTS is the dates and show times.

Cancel customer reservation

This option is available through the Modify/Cancel Reservation option. Cancel Customer Reservation is similar to the staff option stated in the Modify Reservation and view information section, aside from the fact that only the manager can cancel a customer's reservation after 24 hours passed since booking time (situation if the customer is black listed).

Update Promotion and announcement

This option is available Add/update Promotion and Announcement option. Manager can add or update the promotion or announcement to the website.

3.4 Non-Functional Requirements

Non-functional specifications are the constraints under which a system must operate and the standards which must be met by the delivered system **[Sommerwille, 1995]**. The Cinema Ticketing System (CTS) must ensures certain web application qualities like user-friendliness, correctness, functionality, reliability, flexibility, efficiency as well as maintainability.

Security

There is an understanding that emphasis has been placed on a secure system when dealing with the personal and financial information of user. CTS will ensure that sensitive information will be handled in a safe and professional manner. In addition, various levels of CTS functionality will be provided according to the user's status.

Reliability

Reliability is the extent to which a program can be expected to perform its intended function with required precision **[Pressman, 2001]**. Because online reservations never stop, CTS will run at all times. Movie information and purchasing capability will be available 24 hours a day, seven day a week. The entire system must consist of consistency and accuracy to prevent and minimized problems and system failures to acquire stability.

Integrity

CTS allows only authorized users to access the system. The valid users have to log on the system by using their username and password. This will ensure the integrity of data and system's performance.

Efficiency

Undeniable, efficiency is the main key for implementing the new meetings management system. Efficiency is understood as the ability of a process procedure to be called or accessed unlimitedly to produce similar performance outcomes at an acceptable or credible speed **[Sommerwille, 1995]**. CTS will ensure efficiencies, in system execution and data storage. The simplicity of the system will enable the new

user to be familiar with the system in a short length time. This system will enable the users especially the employees to handle their jobs with minimum load by reducing time, manpower and other resources.

User friendliness

User interfaces design creates an effective communication medium between a human and a computer. Therefore, it is very important to make sure that the interfaces fulfill user-friendliness so that it would not cause trouble to users. The Golden Rules **[Mandel, 1997]** coins three rules:

- Place the user in control

  This will define interaction modes in a way that does not force a user into unnecessary or undesired actions. Besides, it also provides flexible interaction for different users for instance via mouse movement and keyboard commands.

- Reduce the user's memory load

  One of the principles that enable an interface to reduce the user's memory load is by reducing demand on short-term memory. The interface should be designed to reduce the requirements to remember past actions and results.

- Make the interface consistent

  The interface design should apply to consistent fashion where all visual information must be organized according to a design standard that is maintained throughout all screen displays. Apart from that, input mechanisms are constrained to a limited set that are used consistently

throughout the application. Lastly, mechanisms for navigating from task to task are consistently defined and implemented.

Multimedia elements will be used to help to reach a certain level of attraction especially to the targeted generation of users.

Response time

A reasonable interval time should be taken during information retrieval from the database. Reduction of lag time will be minimized.

Accessibility and simplicity

There is a realization significance of a large customer base. Therefore, CTS will be within the reach of all customers with access to the internet. CTS is equipped with an interface that is easy to employ for all users, regardless if their individual levels of computer experience.

Maintainability

System maintenance accounts would require more effort if the system is not designed according to good programming practices. Maintainability is the ease with which a program can be corrected if an error is encountered, adapted if its environment changes, or enhanced if the customer desires a change in requirements **[Pressman, 2001]**. As the to-be-developed CTS will be built by using ASP.net which is object-based programming that enhances object-oriented concept, therefore, it is strongly believed that bugs or system faults can be detected and fixed in the shortest time. This

is because object-oriented design makes sure that each class or object will only strictly handle one particular task or functionality.

3.5 Chosen Platform, Web Scripting Technology, Database and Language

3.5.1 Chosen Development Platform

For the CTS, Windows is chosen as the development platform. Microsoft's Windows 2000 is built to work with a series of microprocessors from the Intel Corporation that share the same or similar sets of instructions.

The main reason for choosing Microsoft's Windows 2000 as the development operating system is because most of the computers in FSKTM are currently installed with Windows 2000. Therefore, the implementation of the new system can be done easily and effectively.

Benefits using Microsoft windows 2000 Professional

Reliable: Windows® 2000 Professional is built upon the rock-solid reliability of Windows NT® technology, which makes it significantly more reliable than either Windows 95 or Windows 98 technology. Reliability improvements in Windows 2000 Professional make it even more stable than Windows NT Workstation. Windows 2000 Professional offers high system uptime, dynamic system configuration and resilience to application failures.

Manageable and easy to use: The support for standards-based security in Windows 2000 Professional protects corporate data in stand-alone and networked environments. Windows 2000 Professional offers a set of built-in tools that make it easier to deploy and manage. In addition, Windows 2000 Professional offers an intelligent user interface that adapts to the way users work thereby making the users more efficient.

Internet-enable user business: Windows 2000 Professional is designed to make it easier for organizations to embrace the Internet. The built-in Internet Explorer (IE), a tightly integrated browser, provides users with a faster and richer Internet experience. With support for Dynamic HTML (DHTML) and Extensible Markup Language (XML), it offers a powerful platform for developers to create highly scalable end-to-end e-Commerce and line-of-business web applications.

Share information more efficiently using the Web.

In the past, performing standard file operations on a network file share was much easier than performing similar operations on a remote Web site. Now, Windows 2000 Server technologies such as Web Distributed Authoring and Versioning (WebDAV) make it as easy to carry out standard file operations on a Web share.

Create Web-based business applications.

Creating Web-based applications that integrate well into traditional business applications can be difficult. Windows 2000 Server overcomes this burden by sharing internet-aware application development tools with IIS, an efficiency that extends applications to the Web and eliminates awkward bridges between internal and external processes.

Bring server operating system functionality to the Web.

In addition to allowing organizations to extend basic file and print services to the Web, Windows 2000 Server supports applications, media, and communications and networking services from a common server platform. This convergence means that everything a company can do with Windows 2000 Server is automatically supported in a fully integrated Web environment.

3.5.2 Chosen Database Management System

As we make comparison between Oracle 8i and SQL Server 7.0, a fact that Oracle 8i can support much more complex database compared to SQL Server 7.0. Nevertheless, as SQL Server also incorporates a world-class feature set for distributed client-server computing; therefore it is still chosen as database management system as it is strongly believed that customers who use SQL Server will enjoy benefits in these key areas **(Wynkoop, 1997):-**

i) Reliable distributed data and transactions

ii) Centralized control of distributed servers

iii) Very high performance and scalability

iv) Support for very large databases

Advantages of SQL Server 7.0:

i. Scalability

SQL Server provides powerful support for large database and complex queries. It is scalable from laptop to multiprocessor clusters to accommodate terabytes of data and thousands of users.

ii. **Internet, Intranet and Commerce**

SQL Server is very important in Internet, Intranet and electronic commerce strategy due to its cutting-edge features and seamless integration with Microsoft Windows NT and Microsoft BackOffice. Furthermore, the Web Assistant enhances the SQL Server Assistant to easily generate HTML and WML files from SQL Server data. It also supports Internet database integration and allows the users to automate the publishing of database information in the HTML documents, built active web sites and conduct the processes on the Internet.

iii. **Desktop, Mobile and Distributed System**

A single code base for all platforms, which from a laptop running Windows 95 to clustered systems running Windows NT Server is provided by SQL Server. It enables employees and customers the ability to work with data reliably from everywhere.

iv. **Ease of Use**

Features provided by SQL Server ensure easy-to-use for database administrators in building, managing and deploying business applications. For example, the Dynamic Self-Management automates many routine tasks. Besides, the profiling and tuning tools also help to simplify the process of finding the process of finding and fixing database problems by capturing and replaying server activity.

v. **Data Warehouse**

The data transformation services make it easy to import, export and transform heterogeneous data using OLE Database, Open Database Connectivity (ODBC) or text-only files. In other words, automatic distributed update

capability across two or more SQL is enabled. Furthermore, the repository integration and the Open Information Model help integrate and share meta-data about SQL Server database, Online Analytical Processing (OLAP) and Data Transformation Services. Besides, referential integrity and quick operation recovery due to numerous failures are maintained.

3.5.3 Chosen Development Data Access Technology

ADO.NET is Microsoft's latest data access technology and, as an integral part of the .NET Framework, is far more than simply an upgrade of previous incarnations of ActiveX® Data Objects ADO. ADO.NET provides an extensive set of .NET classes that facilitate efficient access to data from a large variety of sources, enables sophisticated manipulation and sorting of data, and forms an important framework within which to implement inter-application communication and XML Web Services.

ADO.NET is essentially a collection of classes that expose methods and attributes used to manage communications between an application and a data store. An integral part of the .NET Framework, ADO.NET simplifies integration of data sharing in distributed ASP.NET applications.

ADO.NET is an expansion of ADO with some of the key concepts retained. ADO.NET has greatly extended to provide access to structured data from diverse sources, which are all accommodated in a consistent, standardized programming model.

ADO.NET can be used in any consumer application that needs to connect to, and communicate with, data sources such as Microsoft SQL Server™, as well as data sources exposed via OLE DB and XML.

Table below shown some of the different between ADO and ADO.NET

Feature	ADO	ADO.NET
Programmability	**Uses Connection object to transmit commands**	**Uses strongly typed programming characteristics of XML**
Memory-resident Data Representation	**Require the JOIN query**	**Supports the DataRelation object**
Data Visitation	**Scans RecordSet rows sequentially**	**Uses a navigation paradigm for non-sequential access**
Disconnected Access	**Provided by RecordSet but typically supports connected access.**	**Communicates with standardized calls to the DataAdapter**

Table 1: Different between ADO and ADO.NET

3.5.4 Chosen Web Scripting Technology

ASP.NET has been selected as the web development tool for the proposed system. The reasons of choosing ASP.NET are as follows:

Enhanced Performance. ASP.NET is compiled common language runtime code running on the server. Unlike its interpreted predecessors, ASP.NET can take

advantage of early binding, just-in-time compilation, native optimization, and caching services right out of the box. This amounts to dramatically better performance before you ever write a line of code.

World-Class Tool Support. The ASP.NET framework is complemented by a rich toolbox and designer in the Visual Studio integrated development environment. WYSIWYG editing, drag-and-drop server controls, and automatic deployment are just a few of the features this powerful tool provides.

Power and Flexibility. Because ASP.NET is based on the common language runtime, the power and flexibility of that entire platform is available to Web application developers. The .NET Framework class library, Messaging, and Data Access solutions are all seamlessly accessible from the Web. ASP.NET is also language-independent, so you can choose the language that best applies to your application or partition your application across many languages. Further, common language runtime interoperability guarantees that your existing investment in COM-based development is preserved when migrating to ASP.NET.

Simplicity. ASP.NET makes it easy to perform common tasks, from simple form submission and client authentication to deployment and site configuration. For example, the ASP.NET page framework allows you to build user interfaces that cleanly separate application logic from presentation code and to handle events in a simple, Visual Basic - like forms processing model. Additionally, the common language runtime simplifies development, with managed code services such as automatic reference counting and garbage collection.

Manageability. ASP.NET employs a text-based, hierarchical configuration system, which simplifies applying settings to your server environment and Web applications. Because configuration information is stored as plain text, new settings may be applied without the aid of local administration tools. This "zero local administration" philosophy extends to deploying ASP.NET Framework applications as well. An ASP.NET Framework application is deployed to a server simply by copying the necessary files to the server. No server restart is required, even to deploy or replace running compiled code.

Scalability and Availability. ASP.NET has been designed with scalability in mind, with features specifically tailored to improve performance in clustered and multiprocessor environments. Further, processes are closely monitored and managed by the ASP.NET runtime, so that if one misbehaves (leaks, deadlocks), a new process can be created in its place, which helps keep your application constantly available to handle requests.

Customizability and Extensibility. ASP.NET delivers a well-factored architecture that allows developers to "plug-in" their code at the appropriate level. In fact, it is possible to extend or replace any subcomponent of the ASP.NET runtime with your own custom-written component. Implementing custom authentication or state services has never been easier.

Security. With built in Windows authentication and per-application configuration, you can be assured that your applications are secure.

Chapter 4

System Design

Chapter 4: System Design

4.1 Introduction

System Design is a phase of the waterfall that the entire requirements for the system are translated into system characteristics. The requirements for system are regarding to the analysis that had been discussed in the previous chapter. System design includes the following issues:

- System Architecture Design
- System Functionality Design
- User Interface Design
- Database Design

4.2 Overview of System Architecture

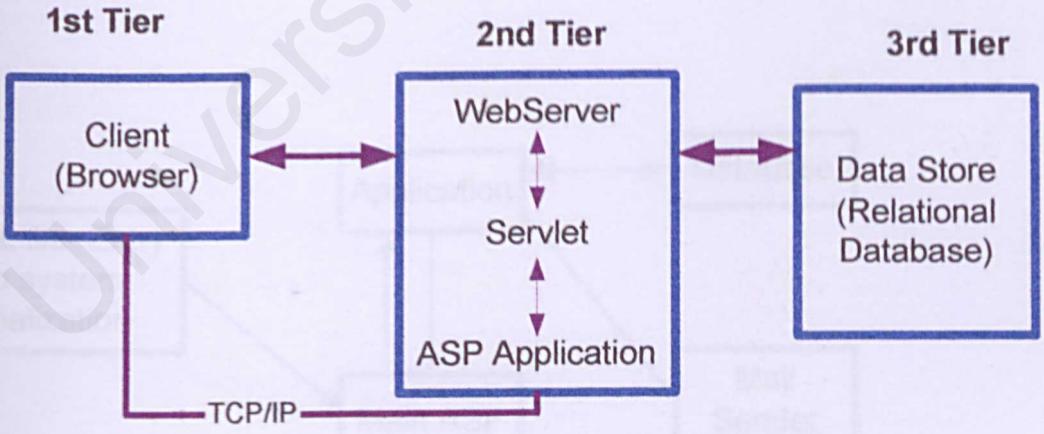
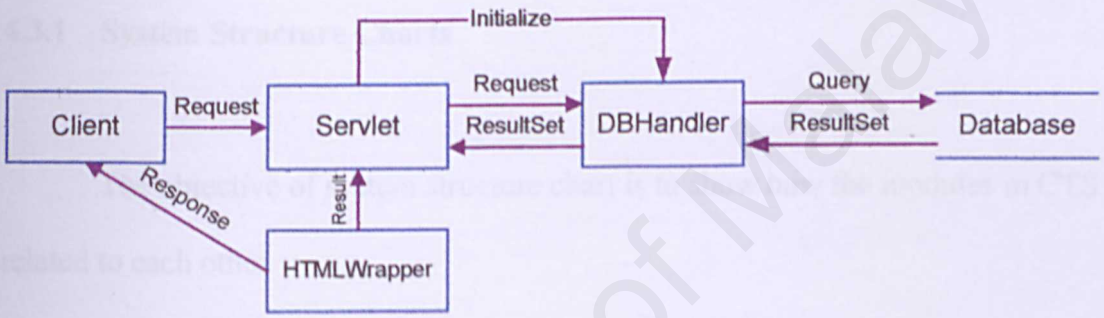


Figure 4.1: 3-Tier Architecture of CTS

The conceptual architecture of the three-tier application applies when we split an application across three tiers are split into three logical components of the application: user interface, computational logic and data storage. In reality, the three-

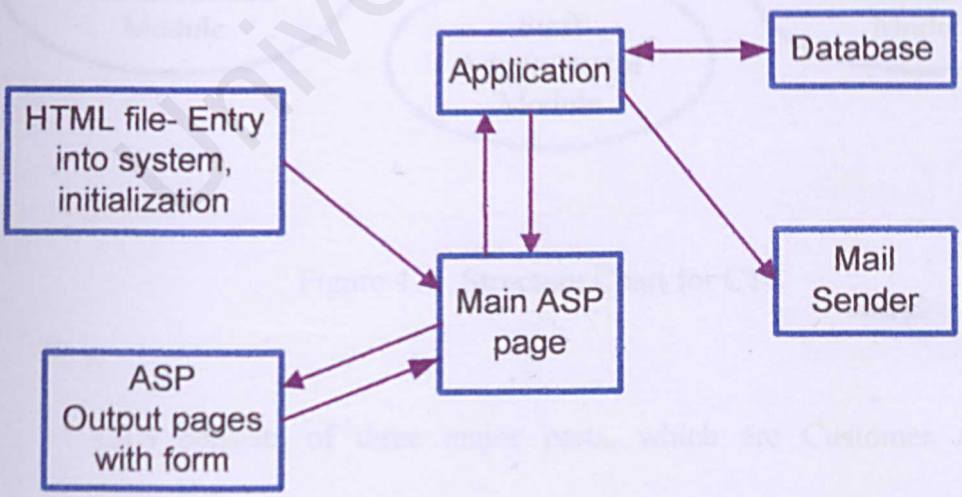
tier Web applications generally consist of a Web browser for the user interface, a Web server connected to a "middle tier" application, and a persistent store that is frequently a relational database. (Refer to Figure 4.1)

CTS will be using ASP as the web development tool. ASP can be used to communicate with the relational database. A simple illustration on both the ways abovementioned is displayed in Figure 4.2 and Figure 4.3.



[Source: Myers, Thomas A, 1999]

Figure 4.2: Communication between ASP Servlets and Database to get relevant output.



[Source: Myers, Thomas A, 1999]

Figure 4.3: Communication between ASP application and Database to get relevant output.

The main purpose of having a three-tier architecture is to assign main functionality to each tier to ensure no function overlapped. Different people could handle each tier using different languages. Therefore, whenever there is error or system fault occurs, the problems can be detected and fixed easily without interfering other tier.

4.3 System Functionality Design

4.3.1 System Structure Charts

The objective of system structure chart is to show how the modules in CTS are related to each other.

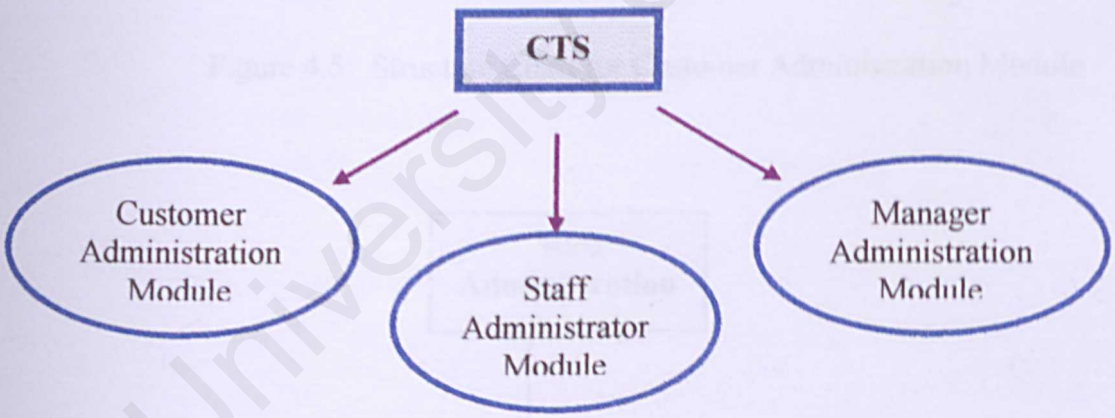


Figure 4.4: Structure Chart for CTS

CTS consists of three major parts, which are Customer Administration Module, Staff Administration Module, and Manager Administration Module. Basically, the Customer Administration Module is to let the customer to view the movie information, seating plan, promotions and announcement. On the other hand,

the Staff Administrator Module is to manage the movie tickets reservation and payment transaction. Finally, the Manager Administration Module is to let the manager to manage the movie information, halls, promotions and announcement.

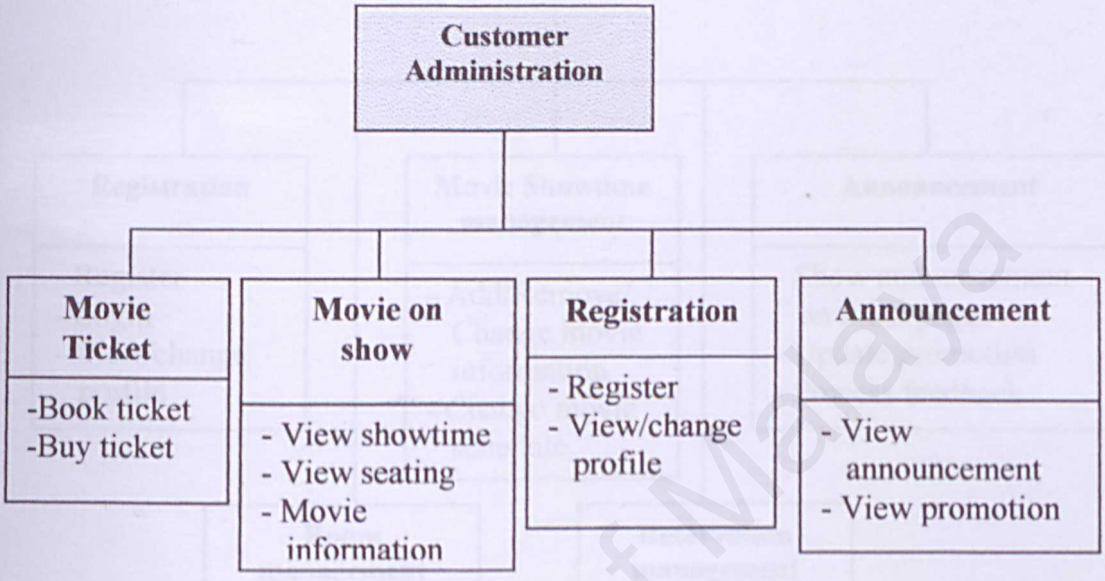


Figure 4.5: Structure Chart for Customer Administration Module

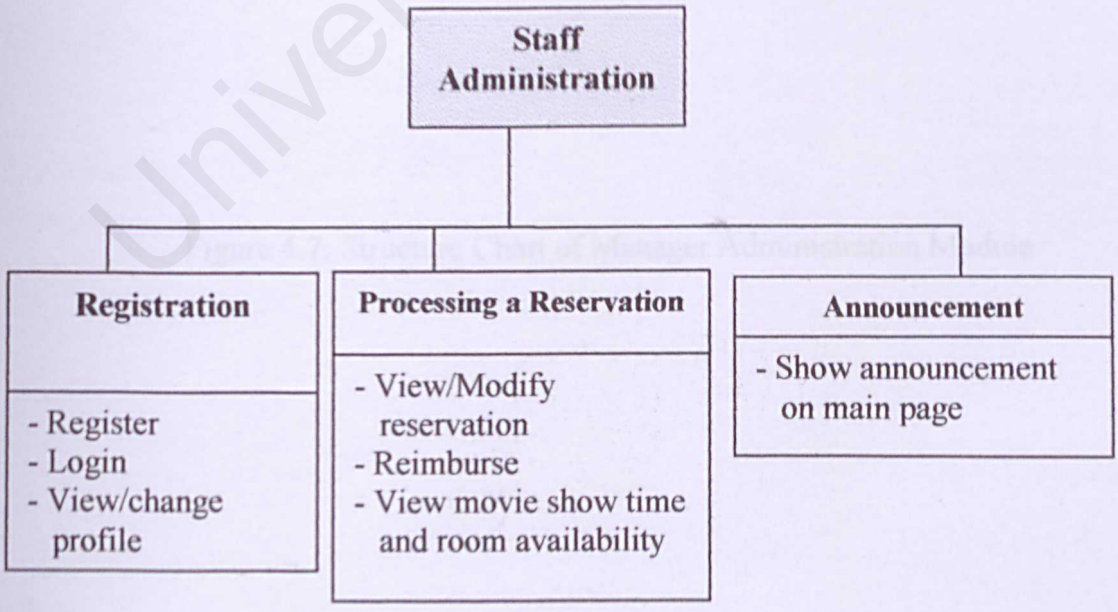


Figure 4.6: Structure Chart for Staff Administration Module

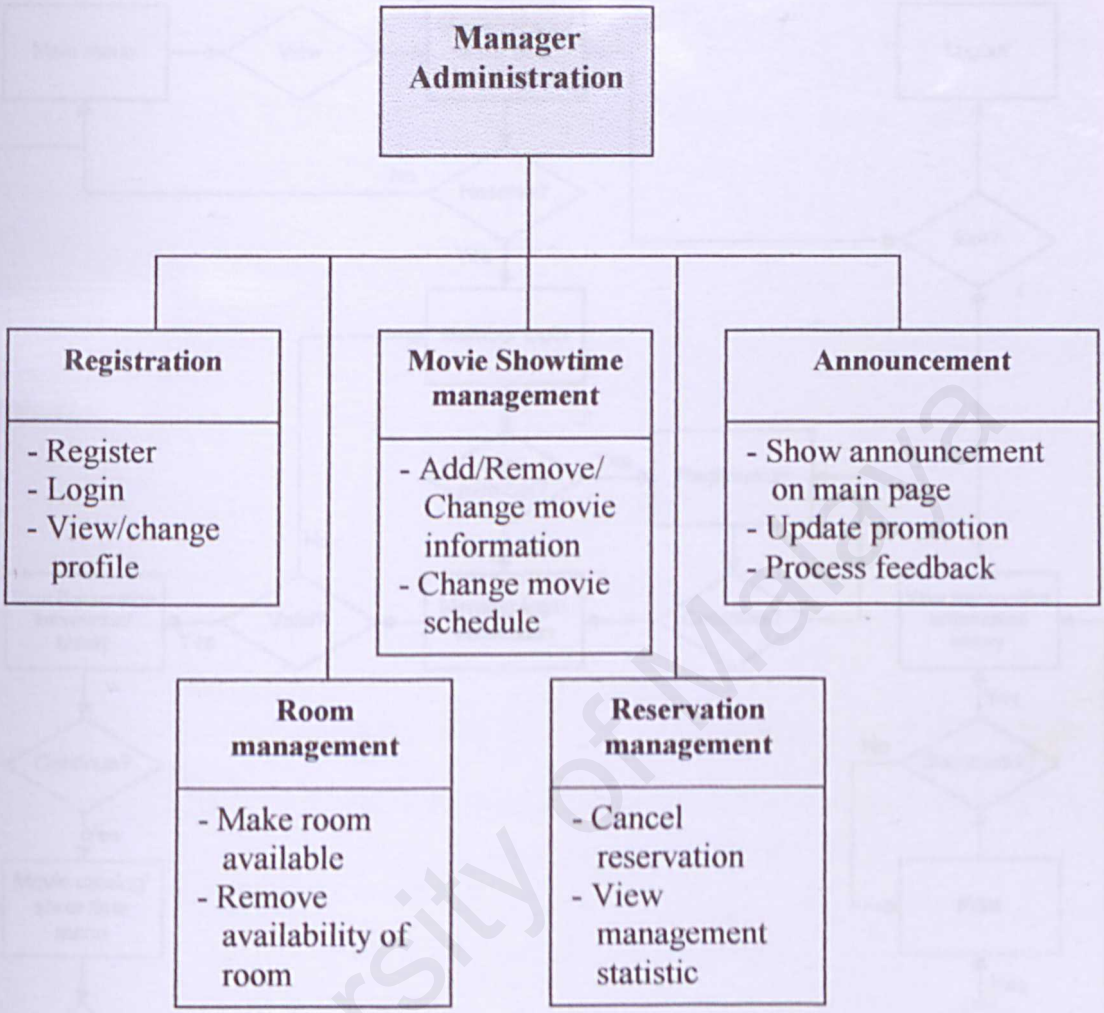


Figure 4.7: Structure Chart of Manager Administration Module

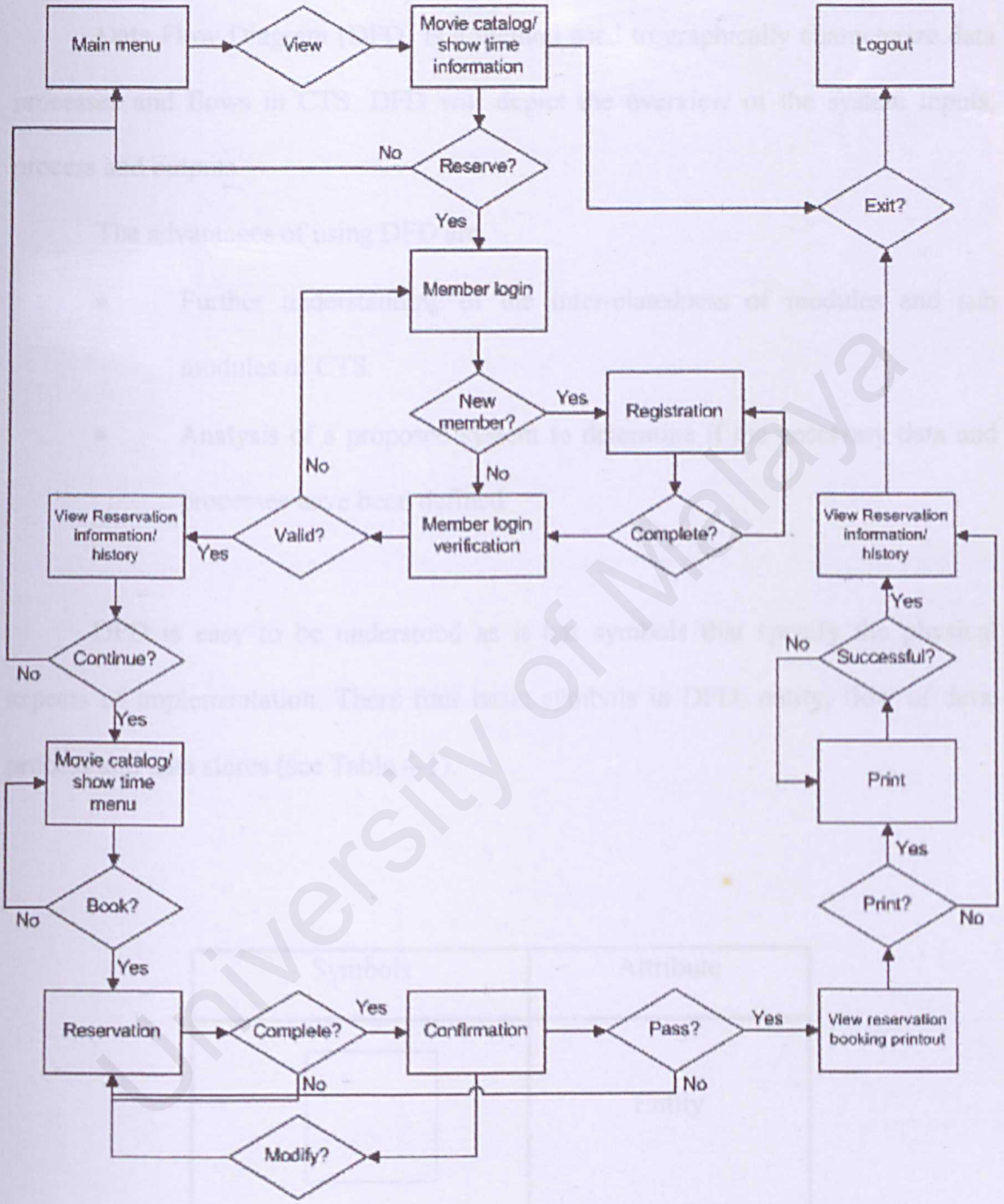


Figure 4.8: Customer flow chart for movie ticket reservation

4.3.2 Data Flow Diagram (DFD)

Data Flow Diagram (DFD) is a method used to graphically characterize data processes and flows in CTS. DFD will depict the overview of the system inputs, process and outputs.

The advantages of using DFD are:

- Further understanding of the interrelatedness of modules and sub modules of CTS.
- Analysis of a proposed system to determine if the necessary data and processes have been defined.

DFD is easy to be understood as it has symbols that specify the physical aspects of implementation. There four basic symbols in DFD: entity, flow of data, process and data stores (see Table 4-1).

Symbols	Attribute
	Entity
	Flow of Data

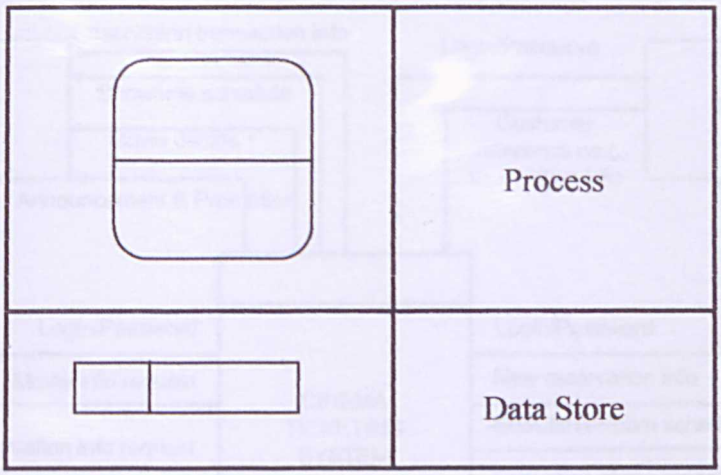


Table 4.1: DFD Symbols

The convention, which is used to design DFD are based on the work by C.Gane and T.Sarson. The data flow is conceptualized with a top-down perspective. So, the Context Level Diagram will be drawn, followed by the Diagram 0. Diagram 0 is an overview process of all the major modules in CTS that includes all the data stores, entities and process involved.

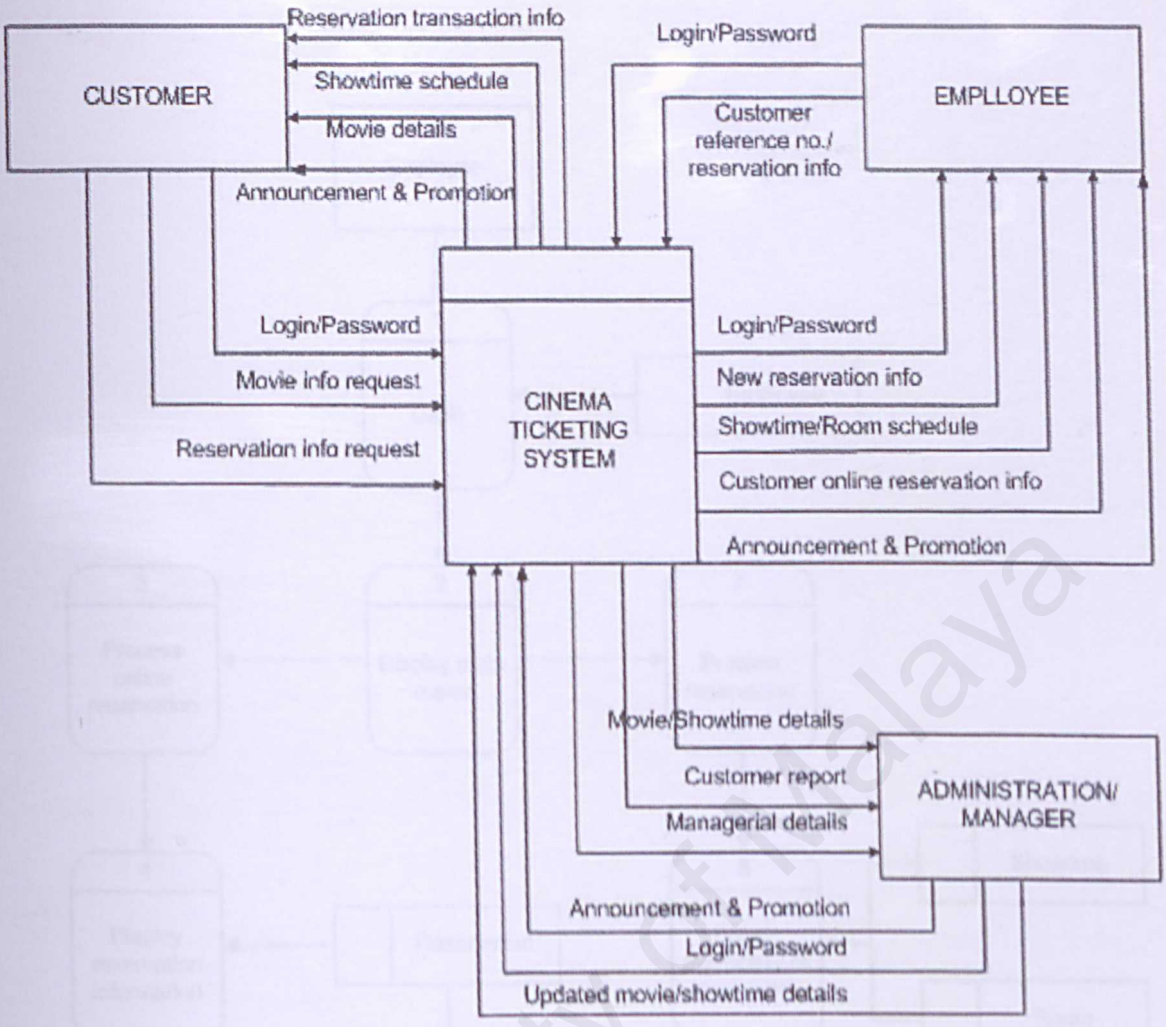


Figure 4.9: Context Level Diagram of CTS

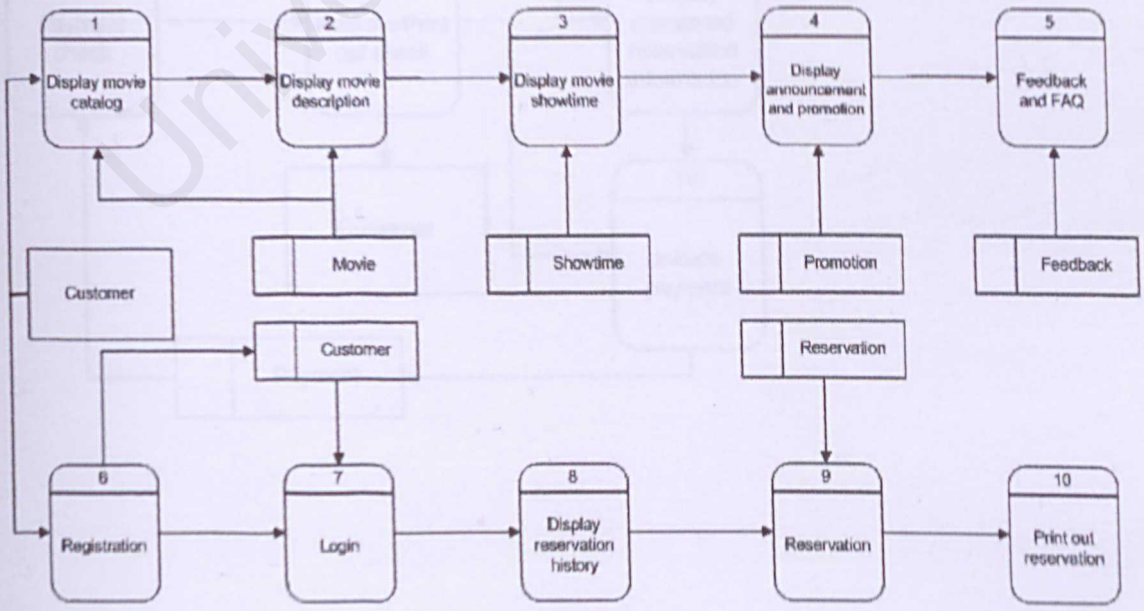


Figure 4.10: Customer Administration Data Flow Diagram

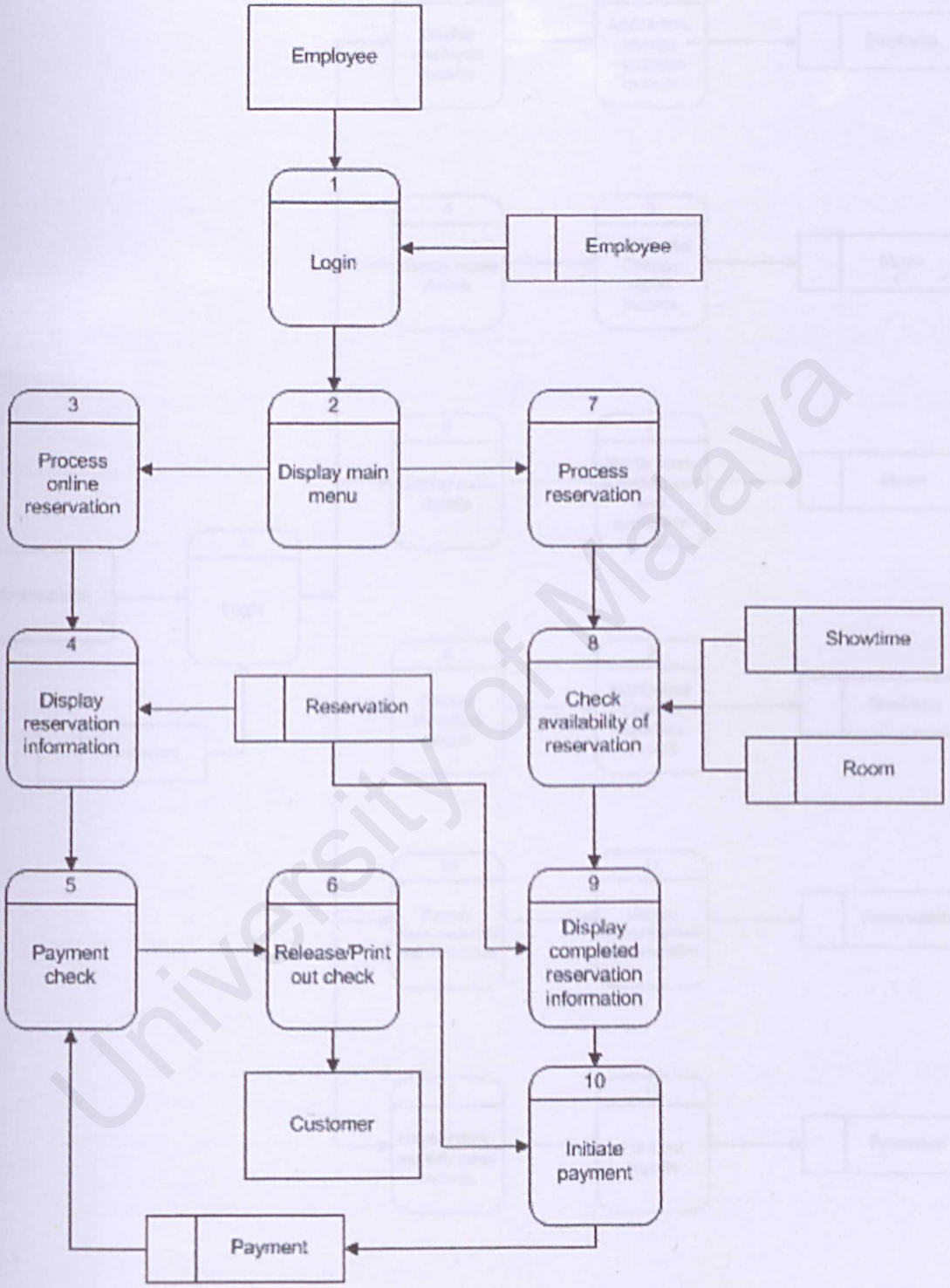


Figure 4.11: Employee Administration Data Flow Diagram

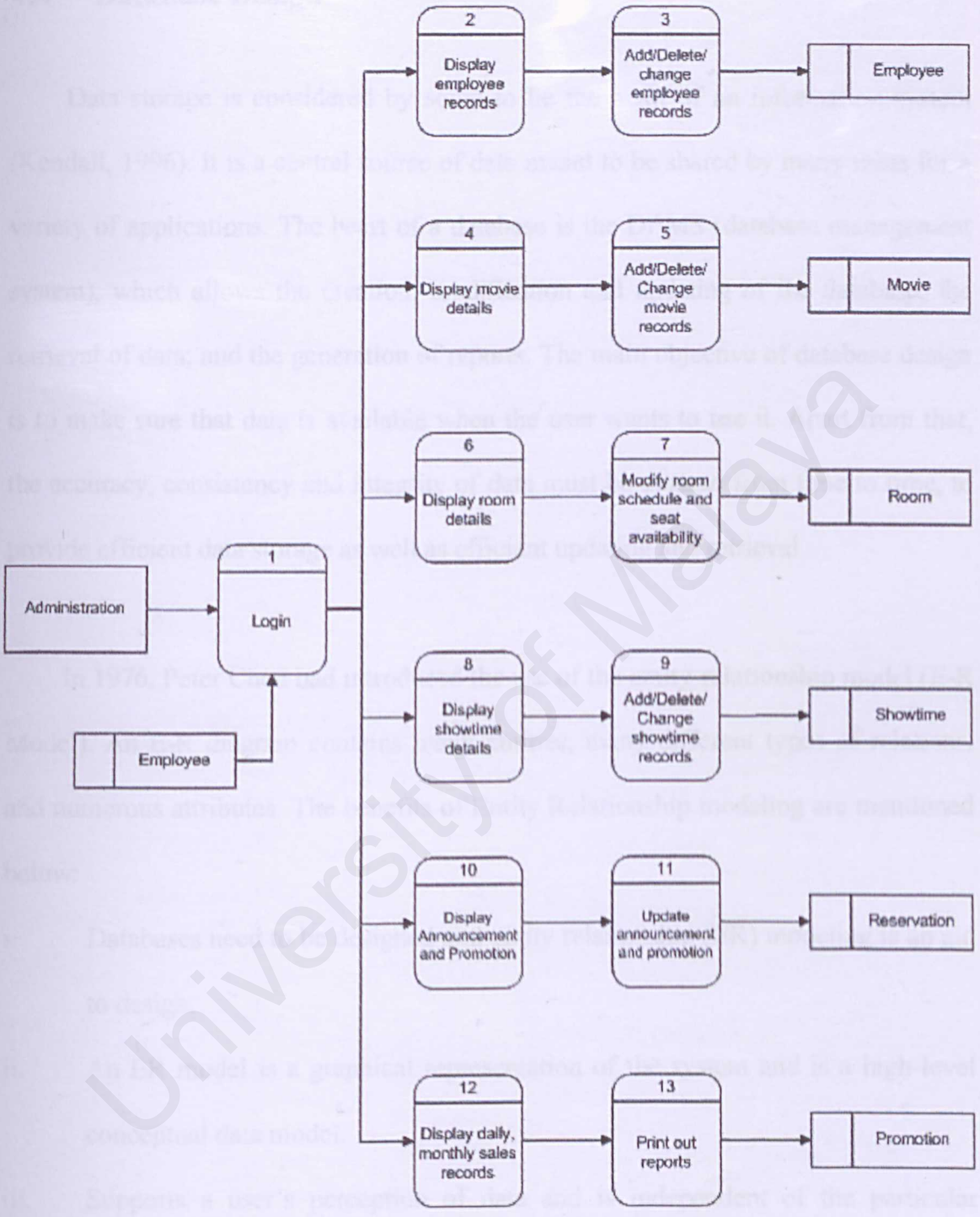


Figure 4.12: Manager Administration Data Flow Diagram

4.4 Database Design

Data storage is considered by some to be the heart of an information system (Kendall, 1996). It is a central source of data meant to be shared by many users for a variety of applications. The heart of a database is the DBMS (database management system), which allows the creation, modification and updating of the database; the retrieval of data; and the generation of reports. The main objective of database design is to make sure that data is available when the user wants to use it. Apart from that, the accuracy, consistency and integrity of data must be assured from time to time, to provide efficient data storage as well as efficient updating and retrieval.

In 1976, Peter Chen had introduced the use of the entity-relationship model (E-R Model). An E-R diagram contains many entities, many different types of relations, and numerous attributes. The benefits of Entity Relationship modeling are mentioned below:

i. Databases need to be designed and entity relationship (ER) modeling is an aid to design.

ii. An ER model is a graphical representation of the system and is a high-level conceptual data model.

iii. Supports a user's perception of data and is independent of the particular DBMS and hardware platform.

4.4.1 Data Dictionary

Data dictionary or metadata can be defined as descriptions of the database structure and contents. Data dictionary defines the field, field type and descriptions of each table.

In CTS, one database had been defined namely CTS and contained 8 tables, which are CUSTOMER, EMPLOYEE, MOVIE, SHOWTIME, ROOM, RESERVATION, PROMOTION, and FEEDBACK.

Database Name: **CTS**

Table name: **CUSTOMER**

Field Name	Data Type	Length	Note
cus_memberid	varchar	8	Customer user name
cus_firstname	varchar	32	Customer first name
cus_lastname	varchar	32	Customer last name
cus_contactnum	int	16	Customer contact number
cus_dob	datetime	8	Customer date of birth
cus_add1	datetime	50	Customer address line one
cus_add2	varchar	50	Customer address line two
cus_add3	varchar	50	Customer address line three
cus_dateregis	datetime	8	Customer register date
cus_emailadd	varchar	50	Customer email address
cus_logincode	varchar	8	Customer password

Table 4-2: Table of CUSTOMER

Table name: **EMPLOYEE**

Field Name	Data Type	Length	Note
emp_loginid	varchar	8	Employee login name
emp_firstname	varchar	32	Employee first name
emp_lastname	varchar	32	Employee last name
emp_contactnum	int	16	Employee contact number
emp_dob	datetime	8	Employee DOB
emp_add1	varchar	50	Employee address line one
emp_add2	varchar	50	Employee address line two
emp_add3	varchar	50	Employee address line three
emp_datestartwork	datetime	8	Employee start working date
emp_emailadd	varchar	50	Employee email address
emp_logincode	varchar	8	Employee password

Table 4-2: Table of EMPLOYEE

Table name: **MOVIE**

Field Name	Data Type	Length	Note
movie_id	varchar	8	Movie id
movie_title	varchar	255	Movie title
movie_synopsis	varchar	500	Movie synopsis
movie_cast	varchar	500	Movie casts
movie_duration	Int	4	Movie duration
movie_category	varchar	4	Movie category

Table 4-3: Table of MOVIE

Table name: **SHOWTIME**

Field Name	Data Type	Length	Note
show_id	varchar	8	Showtime id
show_movietitle	varchar	255	Movie title
show_startdate	datetime	8	Movie start showing date
show_enddate	datetime	8	Movie stop showing date
show_time	varchar	16	Movie show time

Table 4-4: Table of SHOWTIME

Table name: **ROOM**

Field Name	Data Type	Length	Note
hall_number	Int	4	Hall number
hall_seat	Int	4	Number of seat
hall_seatnum	Int	4	Seat number

Table 4-5: Table of ROOM

Table name: **RESERVATION**

Field Name	Data Type	Length	Note
res_transactionnum	varchar	8	Transaction number
res_termofpayment	varchar	16	Term of payment
res_numofticket	smallint	2	Number of ticket
res_movietitle	varchar	255	Movie title
res_showtime	datetime	16	Movie show time
res_date	datetime	8	Transaction date
res_customerid	varchar	8	Customer user name
res_paymentamount	Int	4	Payment amount

res_seatnum	varchar	50	Seat number

Table 4-6: Table of RESERVATION

Table name: **PROMOTION**

Field Name	Data Type	Length	Note
pro_id	varchar	8	Promotion or announcement id
pro_content	varchar	500	Promotion or announcement
pro_date	datetime	8	Date
pro_manager	varchar	8	Employee ID

Table 4-7: Table of PROMOTION

Table name: **FEEDBACK**

Field Name	Data Type	Length	Note
feed_id	varchar	4	Feedback id
feed_content	varchar	500	Feedback content
feed_cusname	varchar	64	Customer ID
feed_date	datetime	8	Feedback date

Table 4-8: Table of FEEDBACK

4.4 User Interface Design

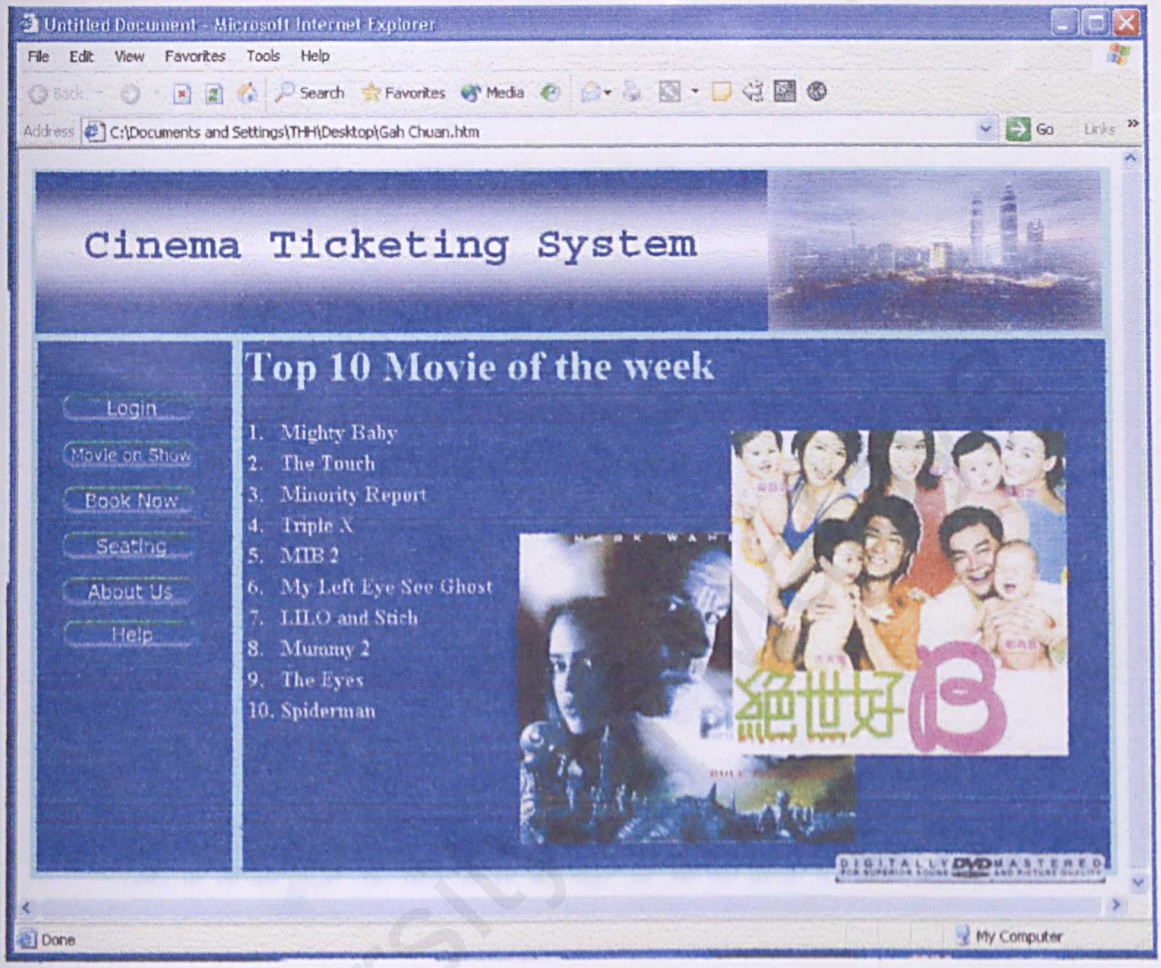


Figure 4.13: User Interface Design

Chapter 5

System Implementation

Chapter 5 - System Implementation

5.1 Introduction

System implementation in software development is a process to convert system requirements into program codes. The initial stage of system implementation involves setting up the development environment. This includes setting up development tools to facilitate the system implementation.

Generally, the development environment is suited according to different development phases, which can be categorized into system design, system development and report writing process.

5.2 Development Environment

Development environment specifies the environment on which the CTS will be implemented. The development environment on which the CTS is build on is important as it plays an important role in determining the successful implementation of CTS.

5.3 System Design

Although system design is clearly stated in chapter 4, nevertheless, during the initial stage of system development, a number of considerations and adjustments were done to the initial system design in order to match the actual needs and requirements.

5.4 System Development

The basic tools used for the system development are:

- Internet Information Service (Web Server)
- Microsoft Windows 2000 Server (Operating System)
- SQL 2000 (Database Management System)
- Microsoft .NET platform
- Index Server (Full-Text Indexing)
- Notepad and Edit plus (Editor for HTML)
- Swish 2.0 (Image design tools)
- Macromedia Dreamweaver (Image design tools)
- Photoshop 7.0 (Image design tools)

5.5 Reports Writing

All the problems encountered, together with solutions found throughout the processes (from system implementation until system evaluation) were recorded as well as result from system testing and system integration.

5.6 System Coding – Coding Approach, Style and Scripting Language

5.6.1 Database Implementation

For DMS, the database is stored in a distributed server in which any data creation, updates or data retrieval will be connected directly to the database server through ADO.NET.

The database includes tables to keep users' details including users' authentications information. CTS is an online application in which the users can create, edit and delete any records directly into the CTS database.

After the CTS is completed and tested successfully, all the raw data were flush from the database. All the unnecessary tables were eliminated from CTS database to avoid data overlapping and to reduce workload of the entire system when deployment.

5.6.2 Application Server Configuration

Internet Information Server (IIS) is a Microsoft's offering a Web publishing and web server that allow users of windows NT/2000to serve web page on the Internet. IIS is available in both Professional and Server version of Windows 2000.

Essentially, all Web page files should be place into the default directory of \InetPub\wwwroot\ and naming the home page Default.htm or Default.aspx. Administrator can choose to create a virtual directory instead of place all the web page in the default root folder.

5.6.3 Index Server Configuration

Index server is a service that uses to maintain an index of documents in computer. Index server does this by extracting information from the documents organizing it for quick and easy access through the search function.

The Indexing Service uses the indexing to filter the text in document and passes the results to a Web or system catalog. The service than searches the catalog for the requested text or phrase instead of searching all the drives on the computer or an entire Web site.

5.6.4 How Index Server use to index documents:

Index server uses a filter to read through the documents and extract the contents and property values. The property values are stored in a path to the document in the index. It then determines the language of the document and breaks the content into individual words.

The Index Server then checks to exception list and removes any words from the documents that are not in the list.

The remaining words are then stored in the index.

5.6.5 Installing and Running Index Server

Although the hardware requirements for the service are the same as those for Windows 2000, the performance can be affected by the size and quality of documents that are indexing. Index server has the capability to index the following documents:

- HTML Documents
- ASCII text documents
- Documents created in Microsoft 95 and later version
- Microsoft Internet Mail and News documents
- Other documents that have filters available (like .pdf)

Recommended Memory Configuration

# of Documents	**Recommended Memory**
<100,000	64MB
100,000 TO 250,000	64MB TO 128 MB
250,000 TO 500,000	128 MB TO 256 MB
500,000 OR MORE	256 MB OR HIGHER

Table5.1: Recommended Memory Configuration

*** Detail configuration are please refer to the appendices**

5.6.6 Virtual directory creation

To enable users to access this system from the internet, a virtual directory has to be created on the server. This is done using IIS. The virtual directory corresponds to the actual directory where all the system scripts are found. To enable user search the DMS, two directories also created. The first is DMS folder where all project folders are located, and this folder is index by the Index Server. Another one is PersonalFolder where all users' personal folders are located. The option "Index This Directory" in the IIS is checked to make sure that the Index Server will index the directory.

5.7 Program Implementation

5.7.1 Coding Approach

The methodology used in this development of the DMS is the incremental prototyping methodology. This phase will begin with module design, followed by the implementation of preliminary prototype. On completion of the preliminary prototype, additional functions are added into prototype. This phase is interactive and may require trace backs to previous stages within the incremental prototyping phase if error were found. It ends with the complete implementation of module.

ASP.NET with VB.NET is used to develop the entire CTS, which code behind method id used. ASP.NET forms are divided into two sections: the user interface and the logic (or code). The user interface comprises HTML markup and ASP.NET web controls, whereas the logic is the programmatic code that interacts with the user interface. This make the page will look more simple and easier to manage.

To increase the coding readability and to help in future enhancements, a page is formed by small pieces of files through the use of "INCLUDE". This is very important as it reduces workload of system developers especially when they make changes on the layout of interfaces. Besides, it also enables system to be developed in shortest time as it allows few developers to work on separate modules at the same time.

5.7.2 ASP.NET page

An ASP.NET page is formed by small pieces of files. Figure below indicated an ASP.NET page (main.jsp), as all the pages include a same file of header.aspx. Therefore, whenever there are changes in the header part, all the pages will be updated at the same time. This simplifies work done during correction or updates on pages.

```
<%@ Page Language="vb" AutoEventWireup="false" Codebehind="Home.aspx.vb"
Inherits="Thesis.Home" %>
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML>
    <HEAD>
        <title>WebForm6</title>
        <meta content="Microsoft Visual Studio.NET 7.0" name="GENERATOR">
        <meta content="Visual Basic 7.0" name="CODE_LANGUAGE">
        <meta content="JavaScript" name="vs_defaultClientScript">
        <meta content="http://schemas.microsoft.com/intellisense/ie5"
name="vs_targetSchema">
    </HEAD>
    <body MS_POSITIONING="GridLayout">
        <form id="Form1" method="post" runat="server">
            <asp:panel id="Panel1" style="Z-INDEX: 101; LEFT: 0px; POSITION:
absolute; TOP: 0px" runat="server" Width="300px" Height="600px">
                <TABLE id="Table1" height="100%" cellSpacing="0"
cellPadding="1" width="100%" bgColor="#000099" border="0">
                    <TR style="HEIGHT: 100px">
                        <TD></TD>
```

```
                                        <TD style="WIDTH: 235px"></TD>
                                        <TD></TD>
                                    </TR>
                                    <TR>
                                        <TD></TD>
                                        <TD style="WIDTH: 235px">
                                            <asp:LinkButton id="LinkButton2"
runat="server" Width="100px" Height="30px" BorderStyle="None" Font-Overline="True"
ForeColor="#FFFFC0" Font-Names="Courier New" Font-Italic="True" Font-
Bold="True">Home</asp:LinkButton></TD>
                                        <TD></TD>
                                    </TR>
                                    <TR>
                                        <TD></TD>
                                        <TD style="WIDTH: 235px">
                                            <asp:LinkButton id="LinkButton1"
runat="server" Width="100px" Height="30px" BorderStyle="None" Font-Overline="True"
ForeColor="#FFFFC0" Font-Names="Courier New" Font-Italic="True" Font-
Bold="True">Login</asp:LinkButton></TD>
                                        <TD></TD>
                                    </TR>
```

Figure5.1: Main Page of the DMS

Chapter 6

System Testing

Chapter 6 - System Testing

The main function of testing is to establish the presence of defects in a program and to judge whether the program is usable in real application. Nevertheless, testing can only demonstrate the presence of errors. It cannot show that there is no error in the program. Therefore, a more suitable approach must be chosen to reduce the possibility of errors in a program.

Bottom-up approach is adopted in system testing for CTS. Each module at the lowest level of the system hierarchy is tested individually. Then, all the tested modules would be related to the next module testing. This approach is repeated until all the modules are tested successfully.

6.1 Types of Testing

In general, the testing process of CTS can be shown in the following figure. All the details will be further explained in subsequent sub-sections.

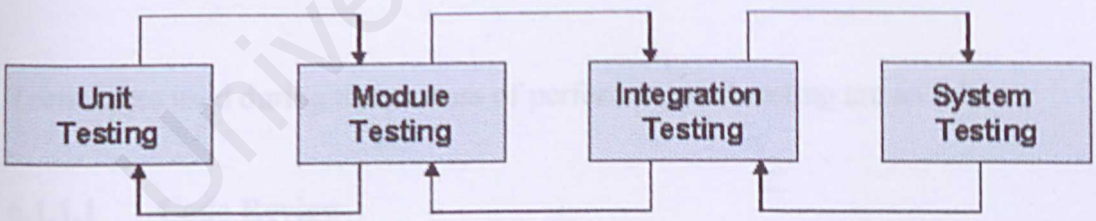


Figure 6-1: Testing Process

6.1.1 Unit Testing

Unit test is the process to test the individual component to ensure that they function properly. Each component is tested independently without the interference from other system components. Unit test is performed concurrently with the development process.

The codes in the components used in the CTS are analyzed to determine the various states that the components will encounter. The test involves running the components in the browser and trying to identify the source of error from the error messages printed on the screen. After all syntax errors are eliminated, test cases are developed to test the codes. Input data is provided to the component in the system and the output is verifying its correctness. Test cases are developed carefully in order to capture the different behaviors of the component. Testing are also involves boundary testing. Other than that, testing also checks to ensure that data from the database is being indexed correctly as the database server is located on a different machine.

Techniques used during the process of performing unit testing are as follows:

6.1.1.1 Code Review

Before a source code is deploying, codes are reviewed line by line to discover any syntax error as well as semantic error. If errors are discovered, they are corrected immediately. Input is typed in and the output is verified for accuracy. This is done by double checking manually to verify that the query results yield records that exist in the repository and that the users does have the rights to view the records.

6.1.1.2 Tracing

This method is faster compared to code review techniques and it is efficient in discovering errors. During the compilation, the VB compiler will detect type of errors in a program and display the error type as well as the line number in which the error occurs.

6.1.1.3 Other Techniques

Other techniques are debugging and use code behind to discover any error during the development.

6.1.2 Module Testing

Module testing is performed without other system modules. A module consists of a collection of dependent components to perform a particular task or function. Different possible test cases are applied to the module and the test results would be verified. Unusual results will be analyzed and they would help in debugging sub-modules in order to produce the desired output.

6.2 Integration Test

Integration test is needed when all modules are integrated. The main focus in integration test is to navigate the interfaces repeatedly to detect any interface mismatch problem.

Several important aspects are checked to ensure that the flow of the data in CTS is well organized and are user friendly to all the system users. CTS use a bottom up testing. Each module is tested for its ability to function after integration. The flow of information from one module to another is verified for accuracy.

6.2.1 System Testing

The sub-systems are integrated to make the entire system. Therefore, the main purpose in system testing is to find errors that result from unanticipated interactions between sub-systems. Besides, it is used to validate whether the system meets its functional and non-functional requirement.

Problems might occur by the time the new developed system is integrated. The test covers the performances, reliability, accuracy and other criteria. Testing is carried in the manner as though the system is in use.

Chapter 7

Evaluation and Conclusion

Chapter 7 - Evaluation and Conclusion

Evaluation is the ultimate phase of developing a system and an important phase before delivery the system to the end users. Evaluation was related to user environment, attitudes, information priorities and several other concerns that are to be considered carefully before effectiveness can be concluded. At all phases of the system approaches, evaluation is a process that occurs continuously, drawing on a variety of sources and information.

7.1 Problems Encounter and Solutions

7.1.1 Setting up server

Many problems faced in setting up the relevant servers in the CTS. This problem is due to lack of experiences in dealing with the servers. Many problems are also faced with index server, which requires a different set of installation procedures compared to IIS.

7.1.2 Interconnecting Server

Problems are faced trying to interconnect the IIS, database server and Index server. The IIS is unable to detect the database server even though connection string is written probably. Index server has to maintenance to make sure it run probably and problem is encounter when errors occur but few people have knowledge about it.

7.1.3 Unfamiliar with New Technology

ASP.NET and VB.NET are still new technology to the computing world. Problems are faced in understanding the concepts and implementing the new technology to develop modules to support the office tacks.

7.1.4 Index Catalog

The index catalog is easily corrupted. This could due to hardware problems, dirty shutdown or perhaps faulty DLL filters. The message that appears on the user's screen reads "The Content Index Is Corrupted". When this happens, the search and the retrieval functions will not be available to users.

7.1.5 Access Control List

Managing the access control of files uploaded into the server by the client is an important issue. There is no automated process associated with the access control management through the web.

7.2 Solution

7.2.1 Interconnecting Server

The problem of interconnecting the IIS server and the database server is solved through setting-up trust relationships among the related server.

7.2.2 Restart Content Server

When the index catalog is corrupted, administrator will have to manually stop and restart the index server. Following this, Index server will re-index the repository. This will take some time, depending on the size of repository. The index server does not have to reinstall.

7.2.3 Information Gathering

In trying to solve the various problems faced in the development of the CTS, I went to browse through the Microsoft web site to look for possible solutions. Apart from the Microsoft web site, other ASP.NET and VB.NET site is also of a great help. I also tried to get advice from developers, programmers and the Microsoft support team.

7.3 Strength

7.3.1 Wide-accessibility

The CTS is a web base system. This has provided wide-accessibility to users where users can access from everywhere in the world. Client-side software only requires the installation of a web browser to access the CTS. Furthermore, browsers are available across all platforms.

7.3.2 Confidentially and Integrity of Information

The strength of the search function lies in the capacity to perform access control checks on information from the data repository. Only information which the user has

access to will be published. This feature protects confidentially of information and also maintains the integrity of the information.

7.3.3 Structure and organizational capabilities

The system allows users to create file structures similar to operating system file storage structures. The file system has the ability to create folders and subfolders for storage of files. The users have the ability to delete a folder, files or even rename a file name.

7.3.4 High Scalability

The CTS is highly scalable. The CTS has scalability which it is possible to add more hardware and software easily to the CTS in the future. The repository does not have to locate on the same machine as the Index server and IIS. This feature makes it possible to implement a dedicated file server or database server. All that needs to be done is to set up trust relations between the servers and create virtual directories so that Index server will be able to index the data.

7.4 Limitation

7.4.1 Platform

The CTS is limited to certain platforms in term of openness. The CTS supports Window 95, Window 98, Window NT, Window 2000 and Internet Explorer 4 or above.

7.4.2 Language Support

The CTS does not support the ability to search for information in different languages. The system is only able to search in English. The ability to provide language support is due to lack of information on how searches can be done in different language and lack of time to test out the implementation of language support in the search module.

7.5 Future Enhancement

As mentioned before, CTS is still not fine enough to work at its full efficiency. Some refining work needs to be done to the system to increase its usability and reliability. The aspects to be refine and some suggestions to upgrade the system are as below:

7.5.1 Version Control

Future enhancement of this system is to provide a simple version control, which may have the following function:

Update a version number of document

Provide logging of the users who have check out the documents, in and out.

7.5.2 Security

Encryption of file. Also should be the file sent via FTP, encryption will ensure that hackers will not be able to tap into the lines. File name of all that files that stored in physical directories are not the original file name. We can use file ID so that other people cannot easily view the filename and open the file using appreciate software. Each connection to the server is protected by SSL session and optionally implement iVest for non –repudiation authentication.

7.5.3 Virus Scanning

Virus scanning capability can be added into the system so that every file uploaded into the CTS is safe and virus free.

7.5.4 PDF File

The CTS system should provide a function to convert text file to PDF format.

7.5.5 Workflow

Documents workflow control and task routing capabilities.

System admin able to create customizes workflow and task routing for a specific catalogue. This routing information is dynamics and can be change at any time.

7.5.6 Language Gained

Search module will include language support. This will enable searches to be carried out in different language. This will broaden the usage of CTS as then it will allow the CTS to be used in countries with different national languages.

7.5.7 Ability to Store Meta Data

Meta data is data about the files. Some examples of Meta data are file type, data created, date modified, keywords, description, owner, creator, last modified by etc.

7.5.8 Other features

- Audit trail features for any activities that perform by the user.
- Statistics and reports of files access and other information and analysis propose.
- Notification by SMS when new documents been added to a catalog.
- Capable to viewing multi-page document via a scrolling page by page or by thumbnail.

Uploading multiple selected files instead of selecting one by one.

Cinema Ticketing System (CTS) Survey Form

Faculty: _____ Course: _____
Year: _____

1. How often you go to cinema watch movie?

   _____

2. Did you visit any cinema organization website before?

   ☐ Yes ☐ No

   If yes, can you list out some?

   _____
   _____
   _____

3. Did you book movie ticket at any website before?

   ☐ Yes ☐ No

   If yes, please list out some.

   _____
   _____
   _____

4. Which method do you find more efficient? Please number from highest to lowest preference.

   ☐ Online booking
   ☐ Phone booking
   ☐ Direct purchase
   ☐ Email

5. If a cinema organization develops a reliable interactive online system that promises effectives and efficiency but requires online payment, will you consider using this online system?

   ☐ Yes
   ☐ No

6. Which payment would you preferred?

   ☐ Credit card
   ☐ Prepaid system
   ☐ E-payment
   ☐ Debit card
   ☐ Smart card

Appendix A: Installation & Configuration

A.1 How to Set Up SQL Server and Index Server to Enable Full-Text Indexing and Textual Search.

A.1.1 Introduction

Microsoft® SQL Server™ version 2000 introduces facilities that support textual queries on data in SQL Server as well as on data in the file system and full-text search on database. Several products and features have been brought together to support this capability, including SQL Server distributed queries, Windows 2000 Server built-in Web server, Microsoft Internet Information Services (IIS) version , and Microsoft Index Server.

A.1.2 Textual Search on File System (Microsoft Indexing Service)

- installing the service,
- pointing it to CTS web site,
- tuning it for speed and efficiency,
- the ASP.NET code which makes it work,
- maintenance

A.1.2.1 Installation

The Indexing Service version 3 is the only one that will run on Windows 2000 at this time (April 19, 2002). It is installed by default. If it is not installed the Indexing Service during the Windows setup, following this step:

Start > Settings > Control Panel > Add/Remove Programs > Add/Remove Windows Components, Check the Indexing Service and then press Next. Windows will install the necessary files and when it's done, click on to finish. User might be asked for the Windows 2000 Server installation CD to copy the necessary files.

A.1.2.2 Creating a New Catalog

A catalog is like a database where the service stores all the information after it is done indexing all the files. So, this system will use the service to search against CTS file system. First, user has to create a web site through the IIS console. Once that running, then user have to tell IIS to Index the web site. (Through the Home Directory tab of the site Properties). Make sure Index this Resource is checked. If not, check it. By default, the Indexing Service will index HTML files, text files, Office 95 and later files, internet mail and news, and any other document that a filter is provided. For example, Adobe makes its own IFilter which once installed, helps the service index Acrobat (pdf) files

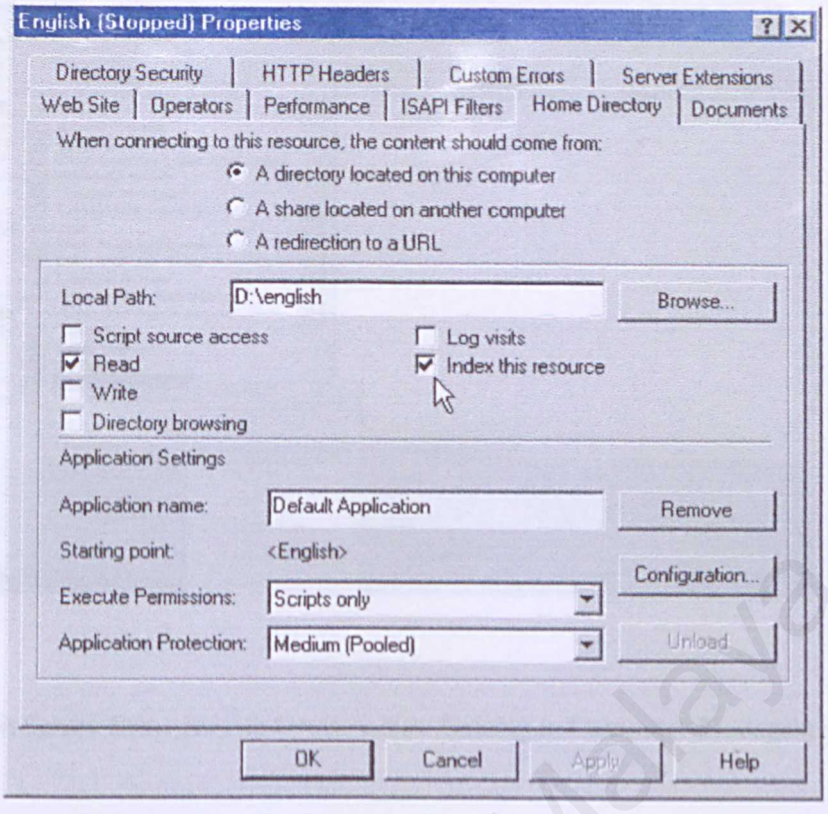


Figure A. 1 Web Site Directory Properties

The next step is to create a new catalog to house all the information. It's probably a good idea to create a new folder to use exclusively for your catalog(s). Then open the Computer Management Console, and right click on the Indexing Service, or click on Action on top, and go to New > Catalog.

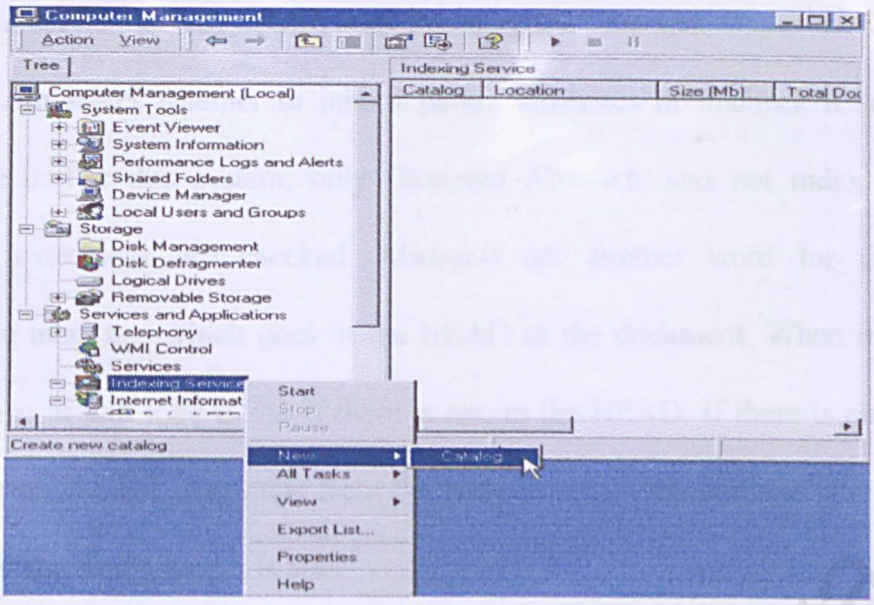


Figure A. 2 : This Screen Show How to Create a New Catalog in Computer Management

Type a name for the new catalog (Full-Text), and pick a location where to save the catalog. After create it, user need to specify what to include or not include in it so that

the service will start indexing that content. Right click on the catalog that wants to edit, click on Properties and move to the Tracking tab. In this case we want it to point to a web site, so user has to tell it what web server to associate it with. Pick one from the pull-down list.

Now when service is start, it will start indexing the web site. Under the Generation tab, user can select whether to inherit parent attributes or uncheck it so that can customize it. For this system, only Generate Abstracts and not index files with unknown extensions are checked. Abstracts are another word for the HTML description meta tag, which goes in the HEAD of the document. When indexing an HTML page, it will look to see if there is one in the HEAD. If there is none, then it will pick the first 320 characters from the body to create the abstract. The maximum number for this string length is 500.

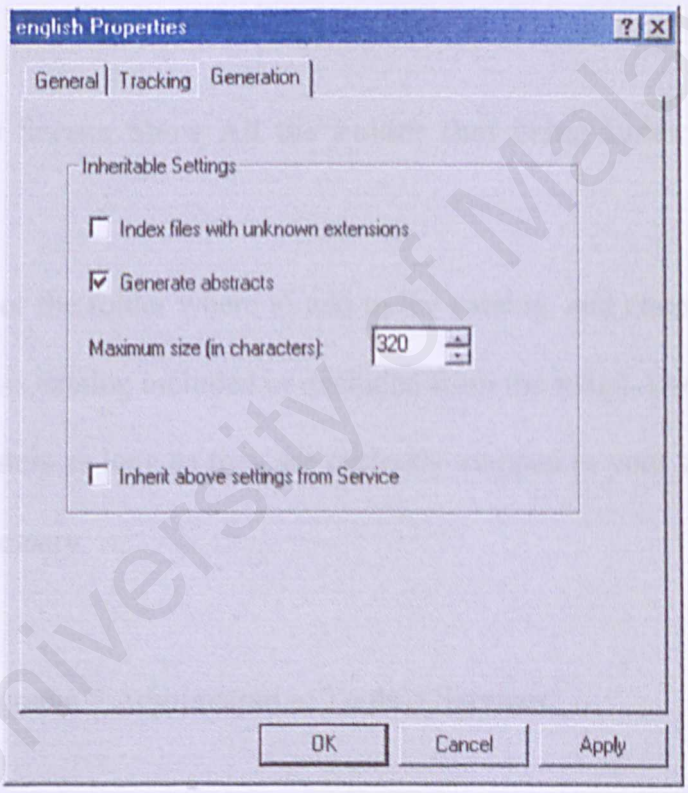


Figure A. 3 How to generate abstract

A.1.2.3 Start to Index a Specify Folder

Go to the Indexing Service Console and right click on Directories and go to New > Directory.

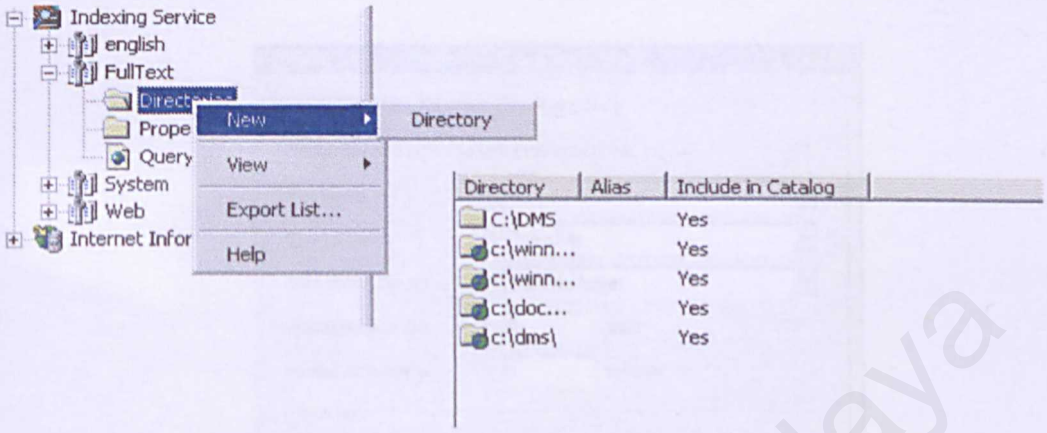


Figure A. 4This Screen Show All the Folder that being Index under Full-text Catalog

Choose the path of the folder where to add to the catalog, and choose from the radio button whether this catalog included or excluded from the index. User can add folders on remote computers as long as they are correctly mapped in your system. The Alias (UNC) is not necessary.

Maintenance

Go to Start > Programs > Administrative Tools > Services:

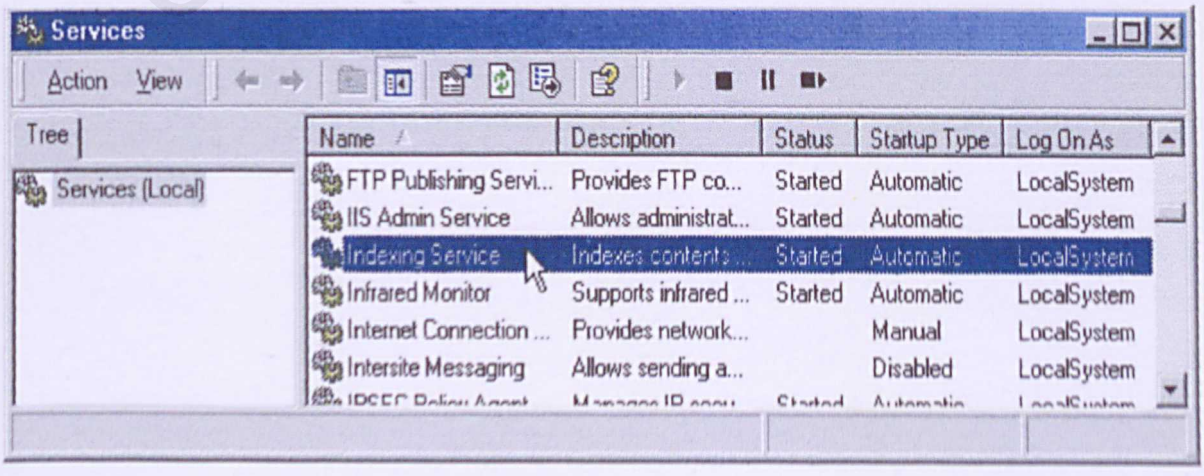


Figure A. 5 How to Recover from Failure

Double click, or right click and go to Properties, on the Indexing Service to open the Indexing Service Properties dialog. Click on the Recovery tab.

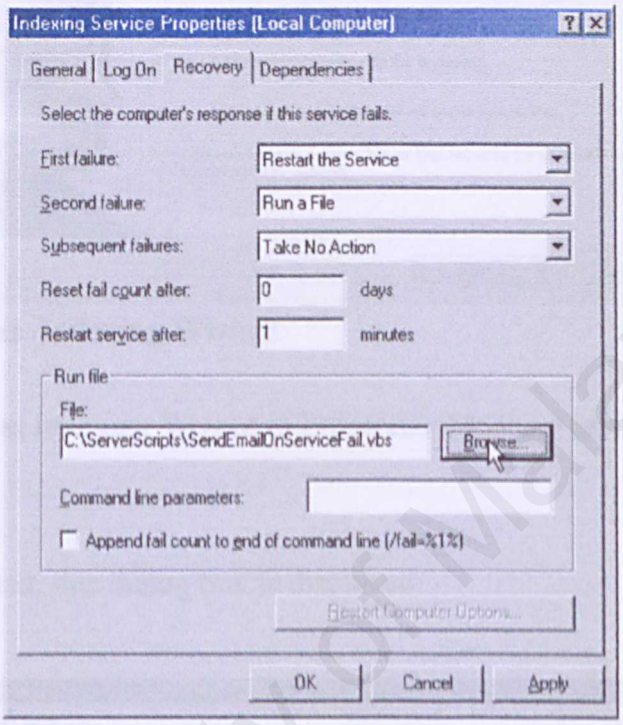


Figure A. 6 Here User can specify what will server do when face failure

A.1.3 Full-Text Indexing On a Table (SQL 2000)

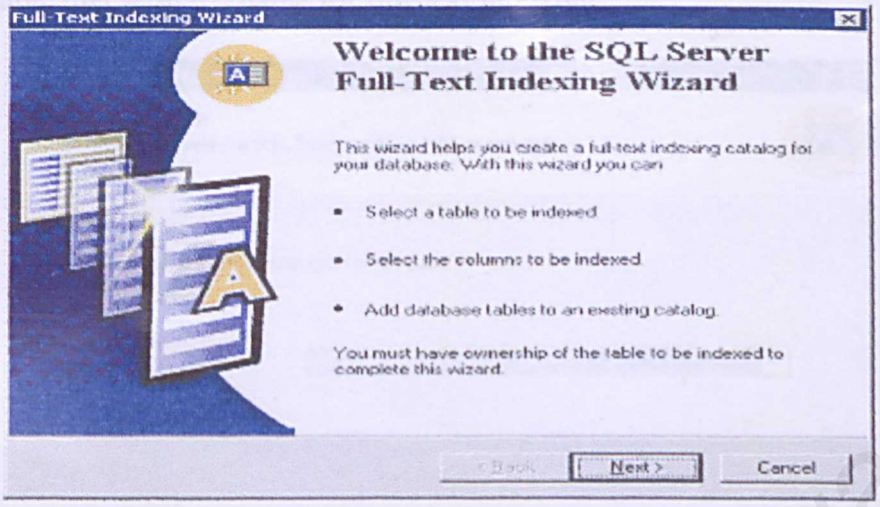


Figure A. 7 Full-Text Indexing Wizard

1. Use of the Full-Text Indexing Wizard in Enterprise Manager involves the following steps:

2. After user click next, this dialog box is displayed:

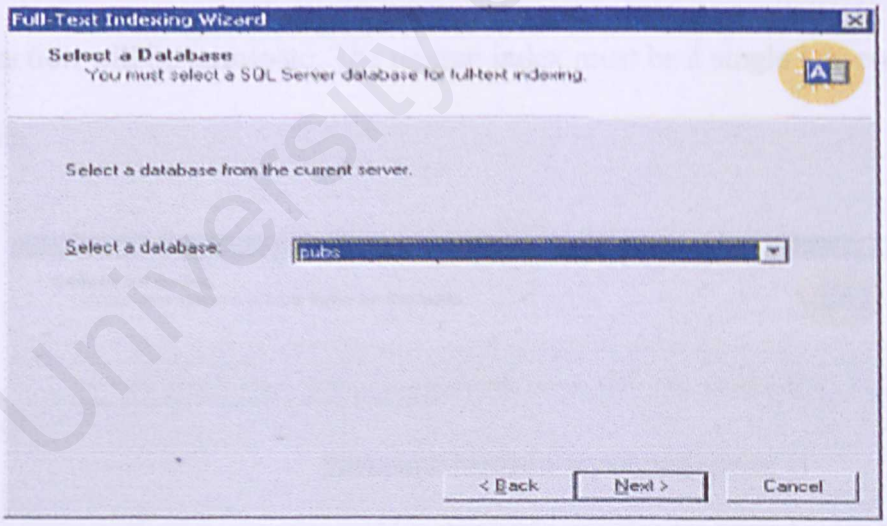


Figure A. 8: Select database name from the drop down list

3. After click next again, this dialog box is displayed: From this dialog box, user can select a table that wish to enable for full-text indexing.

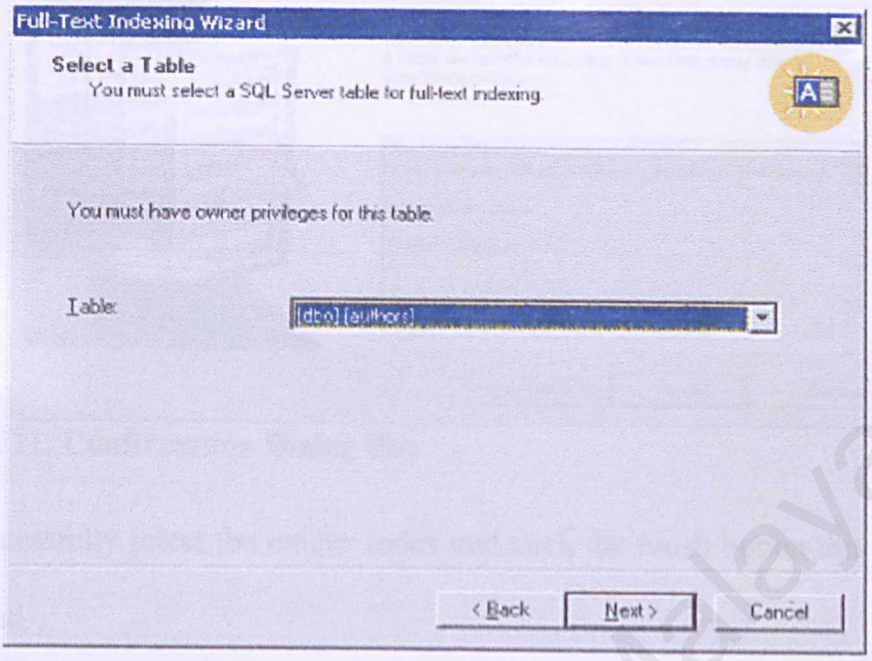


Figure A. 9: Screen that enable table for full-text indexing

4. After that, to enable a table for full-text indexing a table must have a unique keys otherwise action will be terminate. The unique index must be a single key column and non-nullable.

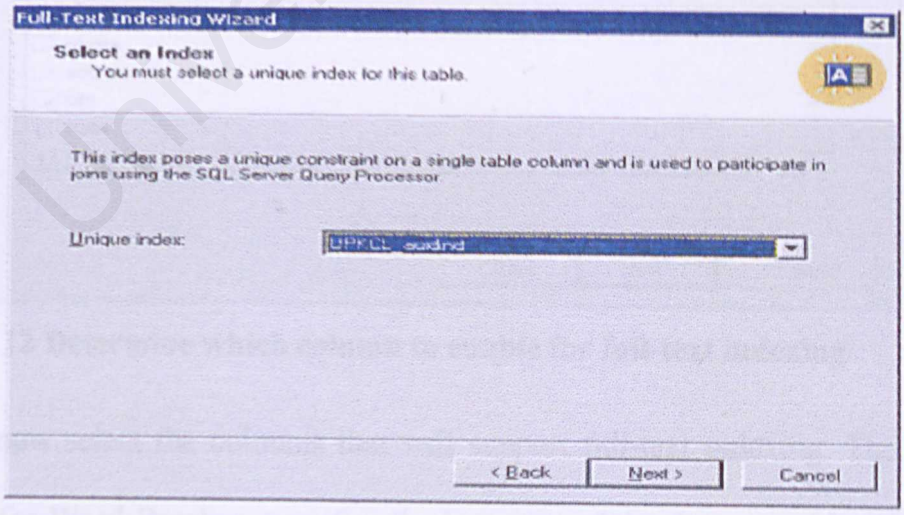


Figure A. 10: Define a unique key

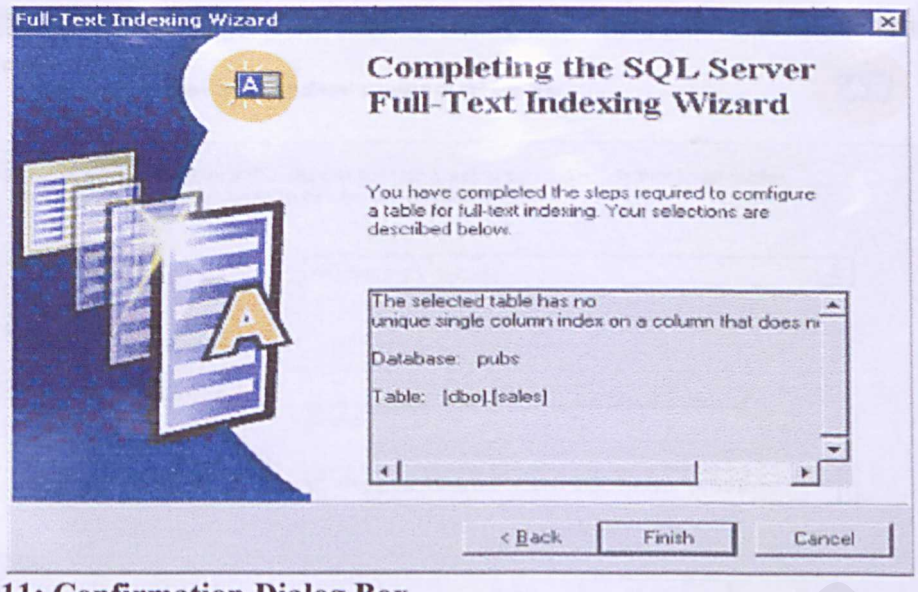


Figure A. 11: Confirmation Dialog Box

After successfully select the unique index and click the finish button this dialog box is displayed.

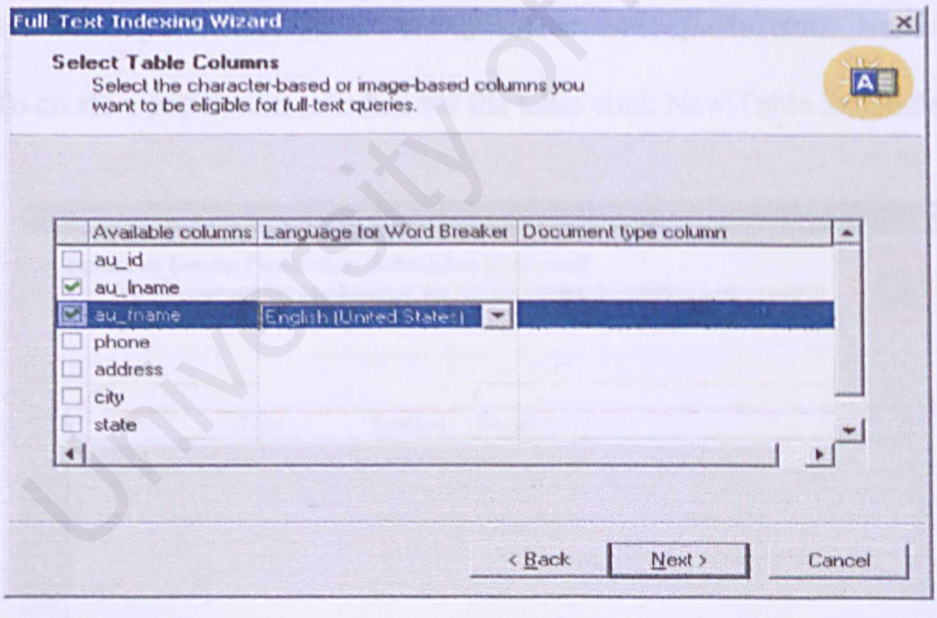


Figure A. 12 Determine which column to enable for full-text indexing

User can now select the columns that will support full-text indexing. The column, Language for Word Breaker, specifies the language of the data stored in the column that will be full-text indexed

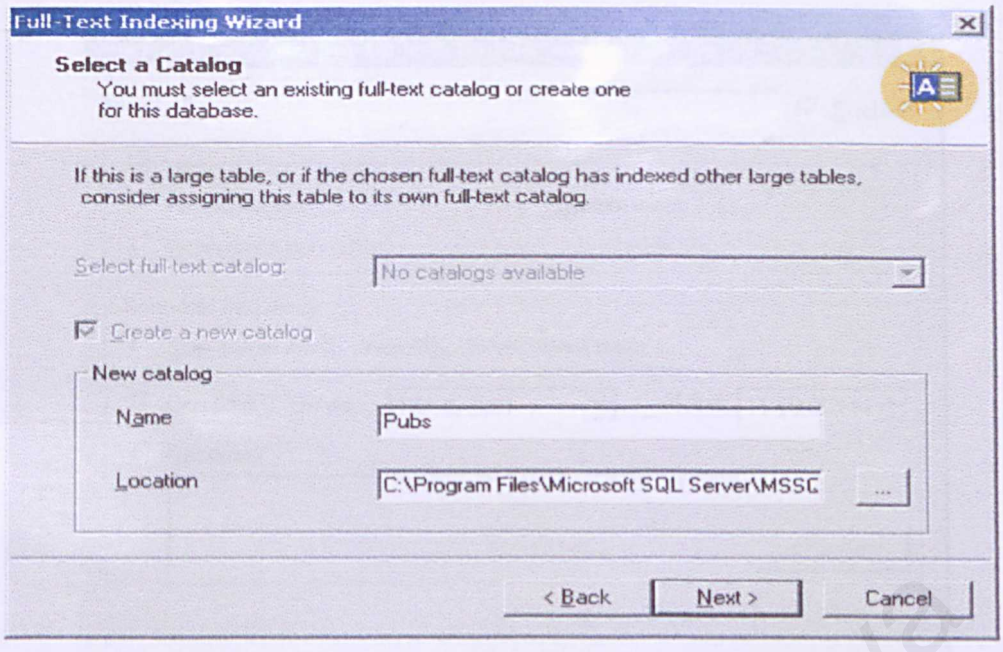


Figure A. 13 New Catalog create screen

User can also specify the location in which the catalog is stored; otherwise, the default location is the Program Files\Microsoft SQL Server\MSSQL$Instance_Name\FTData folder. To create a population schedule for the table click New Table Schedule

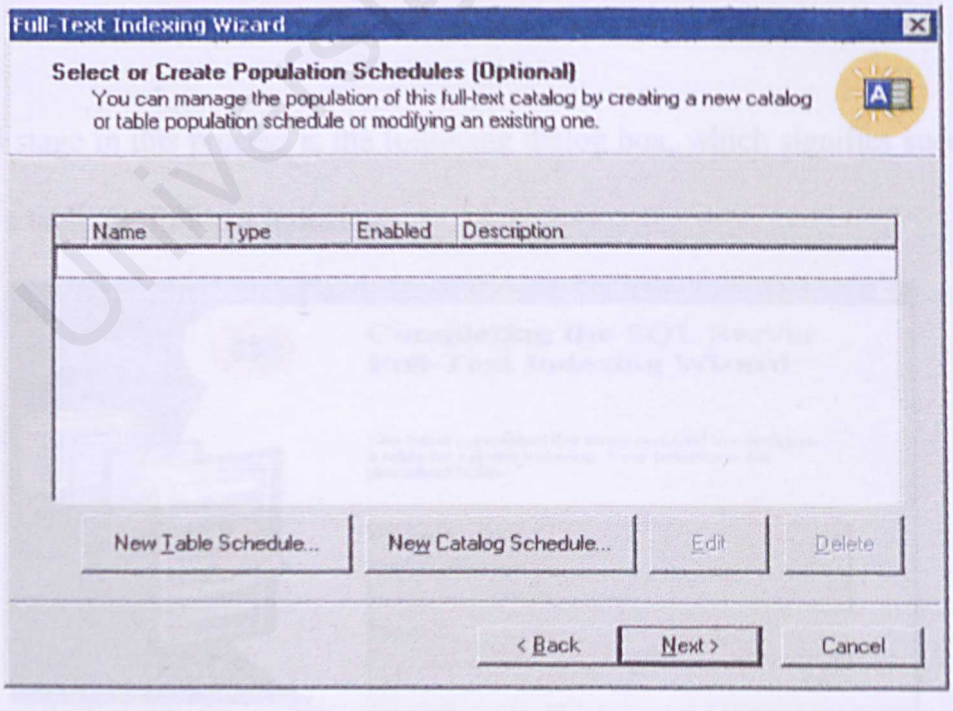


Figure A. 14:Click the New Table Schedule to generate a new table schedule

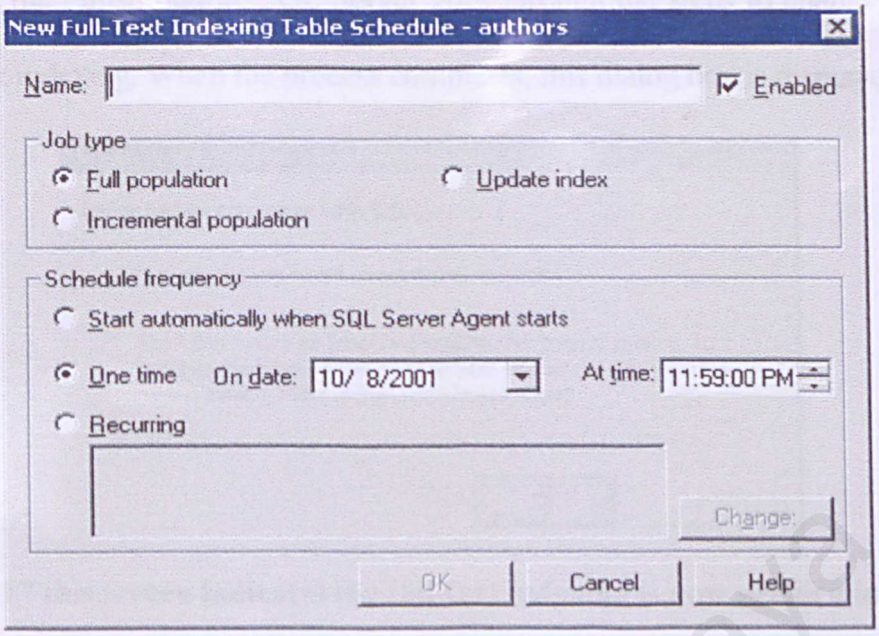


Figure A. 15 New job schedule properties

In this dialog box, the Update Index option corresponds to a change tracking population:

User can determine what the indexing will perform when the system has occur any changes on the table.

The final stage in this process is the following dialog box, which signifies success in enabling a table for full-text indexing:

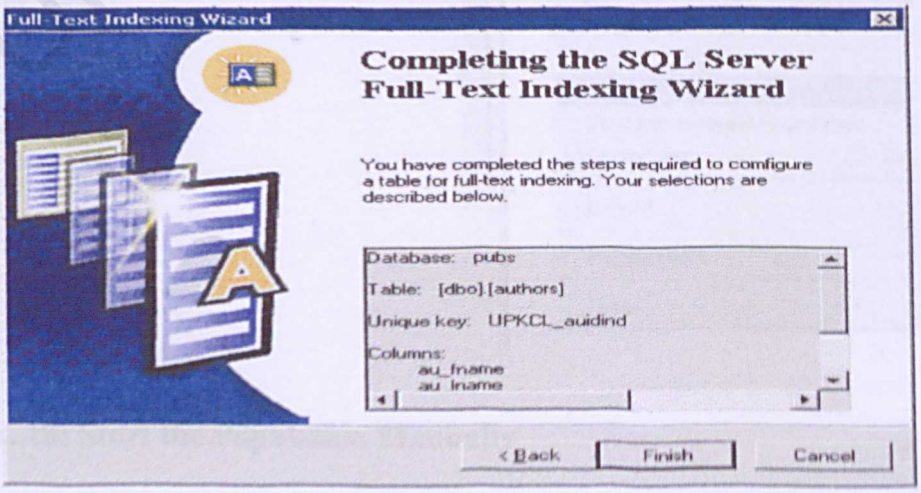


Figure A. 16 Final Confirmation Screen

After click the Finish button, SQL Server goes through the steps to enable the table for full-text indexing. When the process completes, this dialog box is displayed:

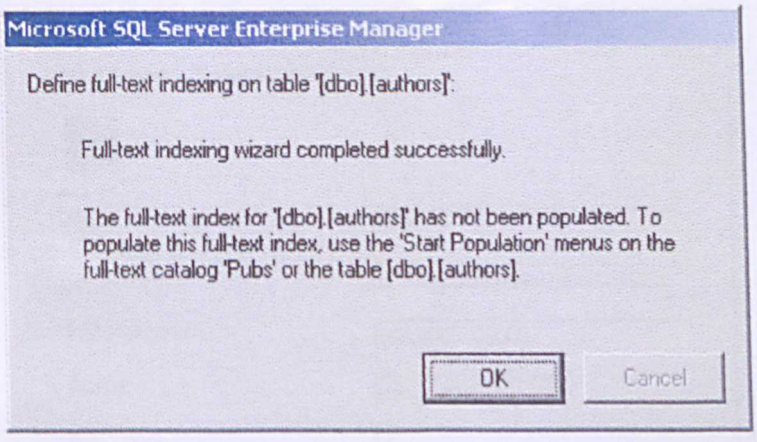


Figure A. 17 this screen indicates the full-text indexing is now performing

A.1.3.1 How to Populate Full-text Index Manually

To start a full or incremental population on a catalog basis, expand the Databases folder, and then click Full-Text Catalog. In the right-side pane, right-click the name of catalog, and then click Start Full Population or Start Incremental Population, depending on the type of population user require.

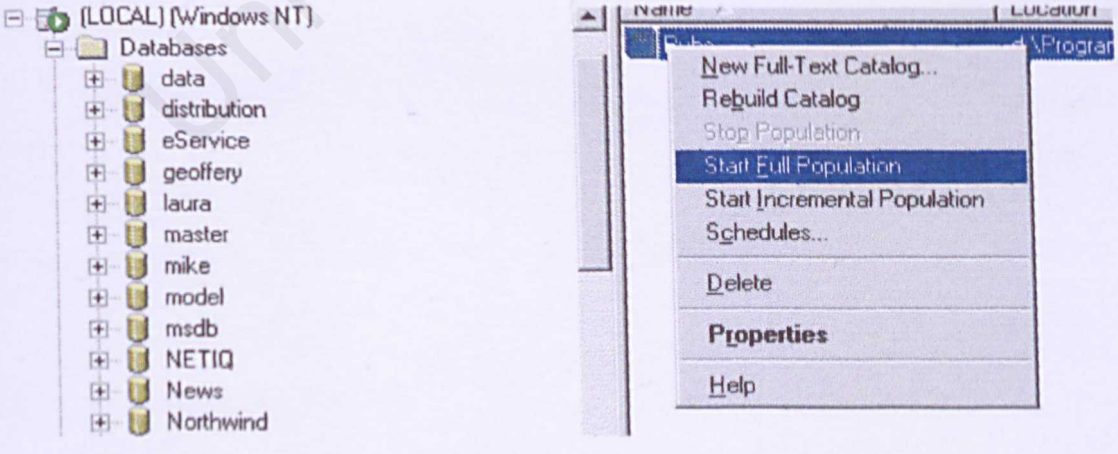


Figure A. 18: Start the Population Manually

To determine if the population has completed, right-click the name of the catalog, and then click Properties. This dialog box is displayed:

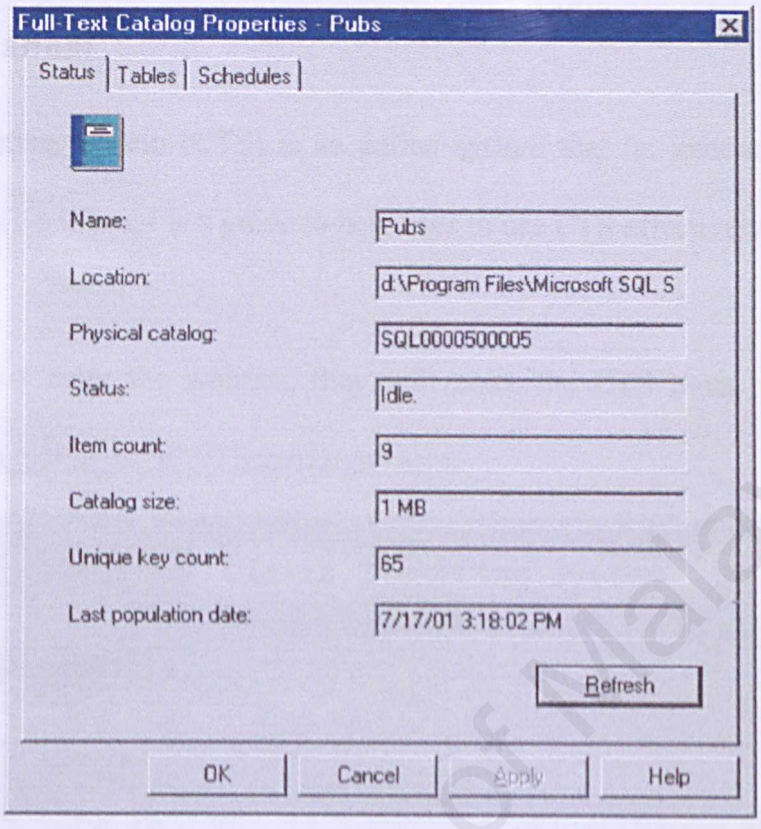


Figure A. 19 Full-text catalog properties screen

Appendix B: User Manual

B.1 User Manual

Cinema Ticketing System (CTS) is an online system that let internet user to book movie ticket. This manual is a guide to help user to use CTS effectively to achieve the goal.

When user first enter the website, they will enter the CTS home page which is http://<domain_name_or_IP>/Thesis/Home.aspx.

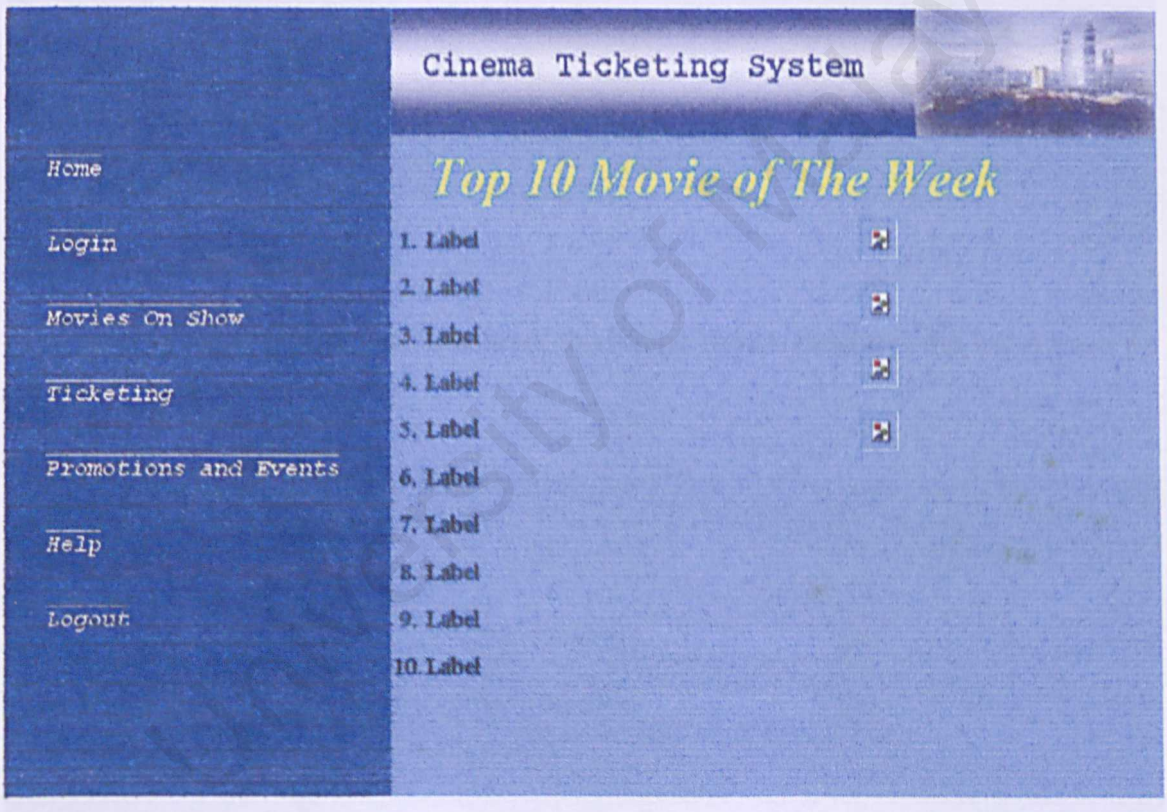


Figure B.1: CTS Homepage

Users have to register as a user of the CTS system.

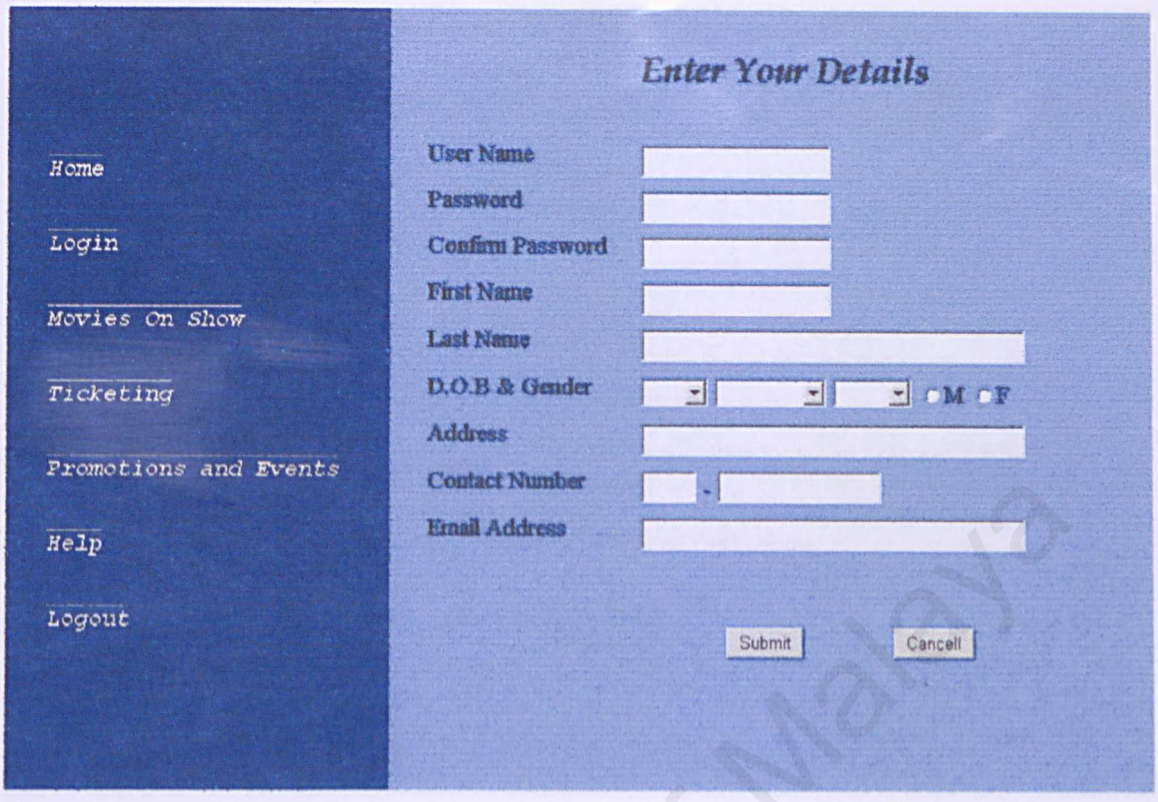


Figure B.2: CTS Homepage

User have to login before they can book the movie ticket. Below is the login page for CTS.

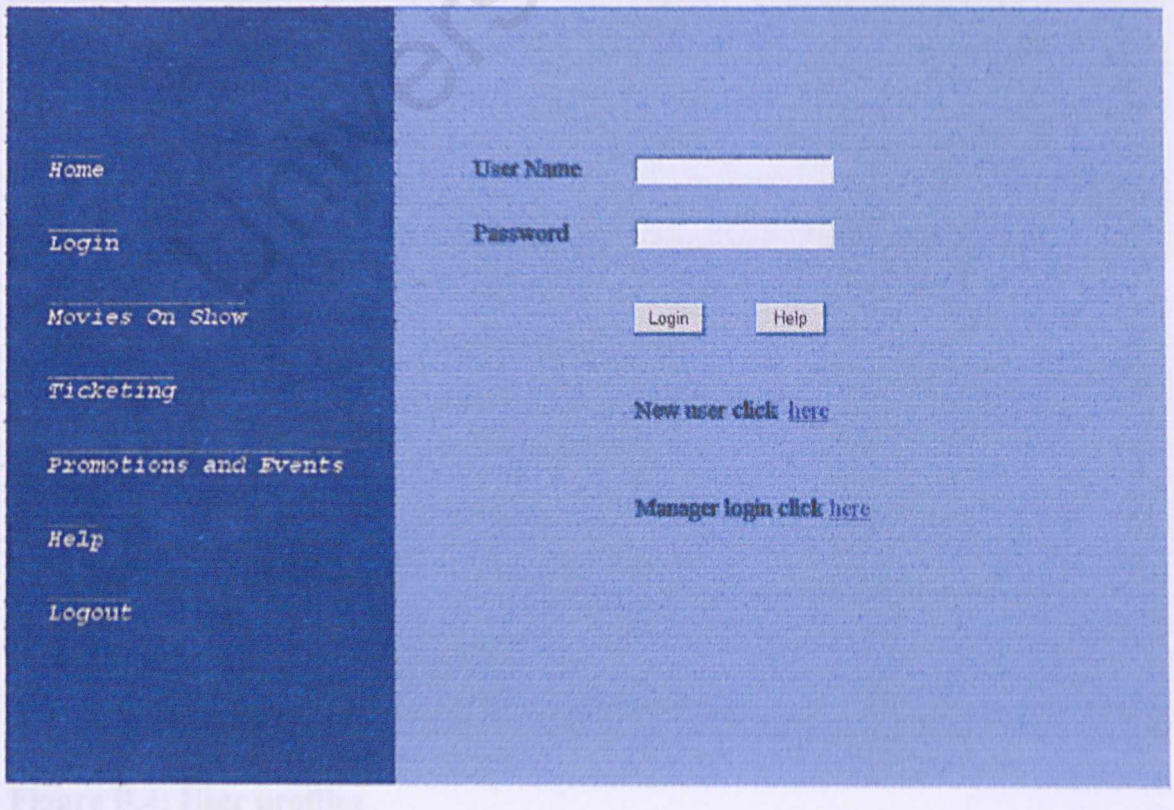


Figure B.2: CTS login page

User also can view the showing movie of the cinema.

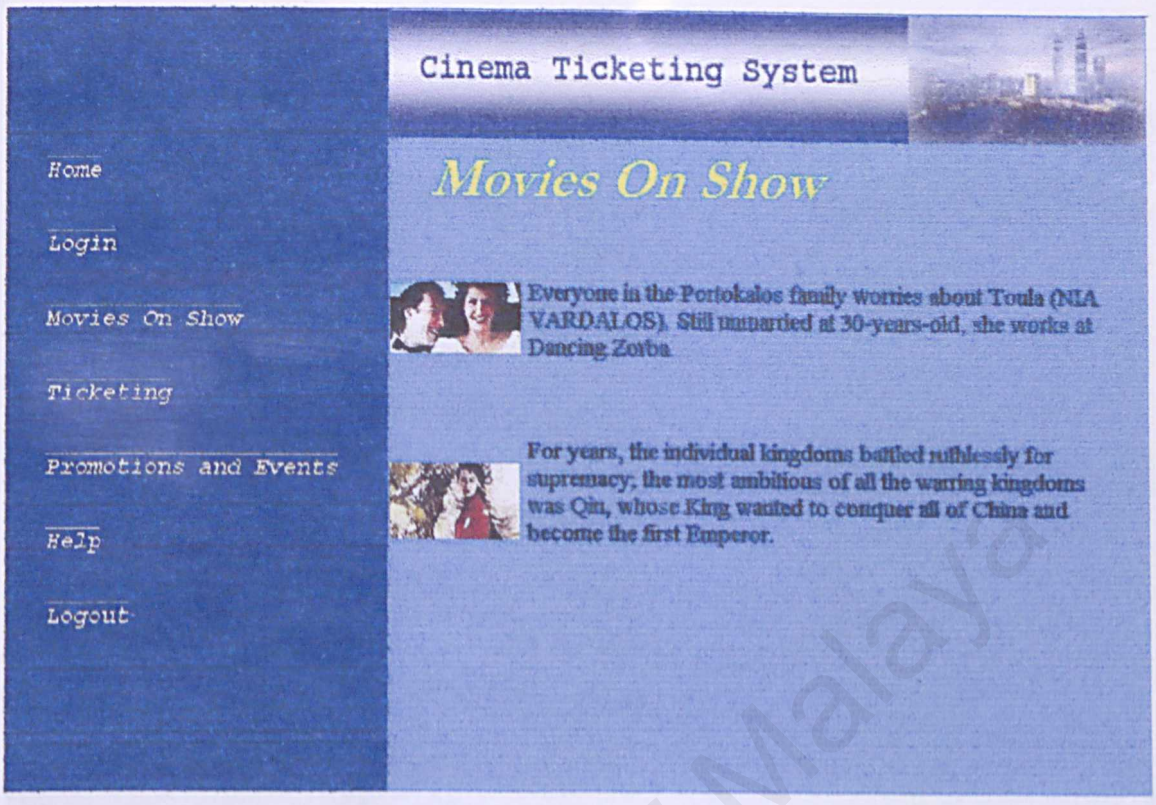


Figure B.3: Moving Showing in CTS

User also can view their details and edit their details.

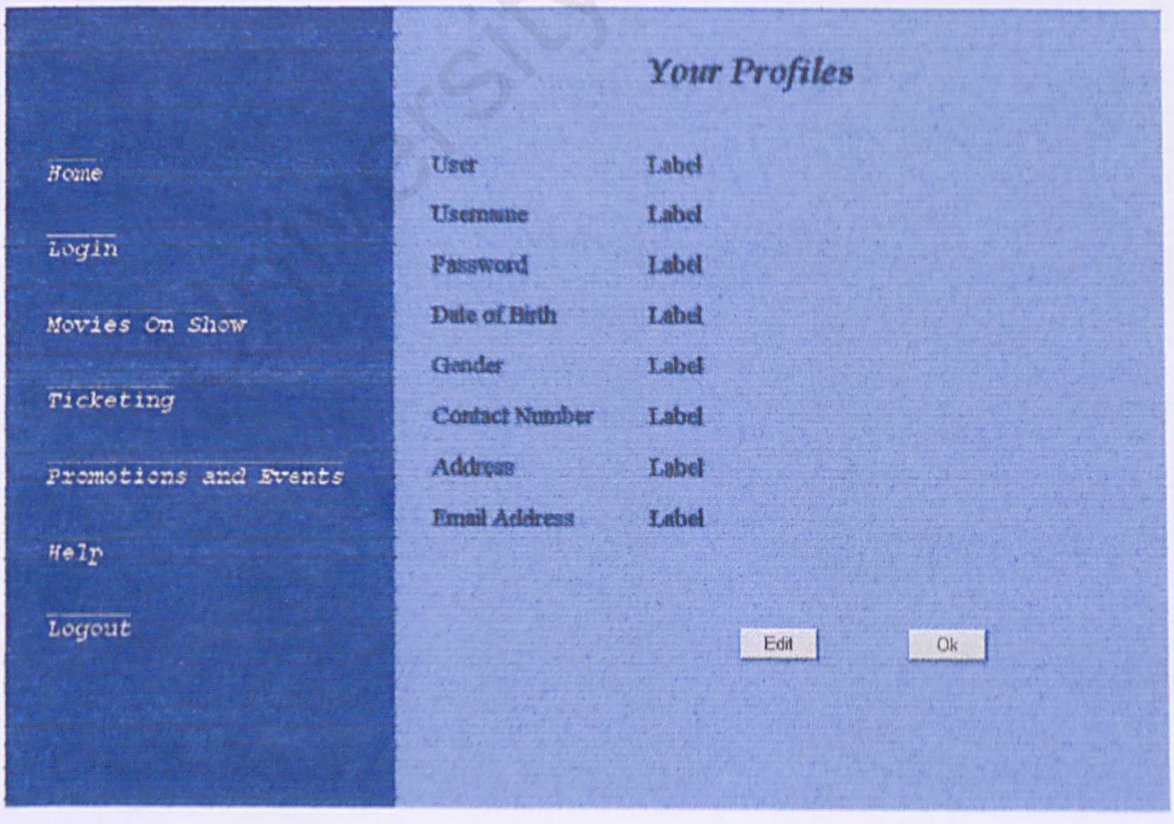


Figure B.4: User profiles

User can book movie ticket after they login to the CTS system, then enter the Ticketing module.

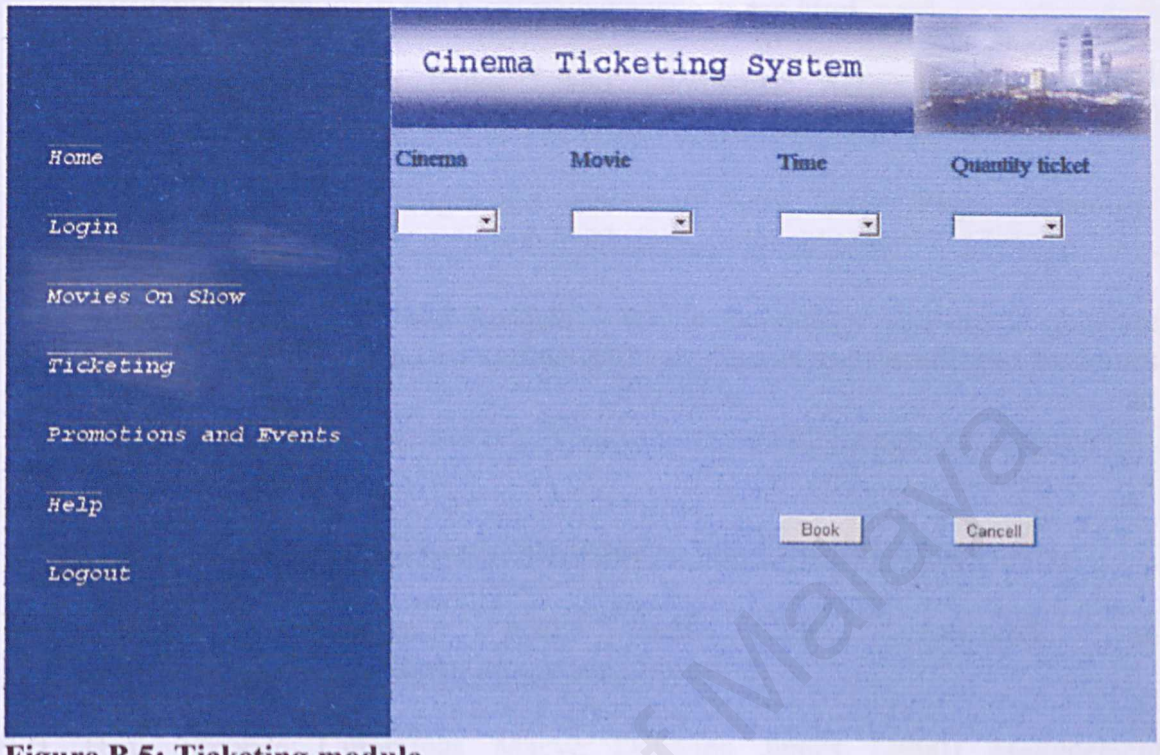


Figure B.5: Ticketing module

The promotion and event module and the help module just provide the information of the cinema.

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